

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

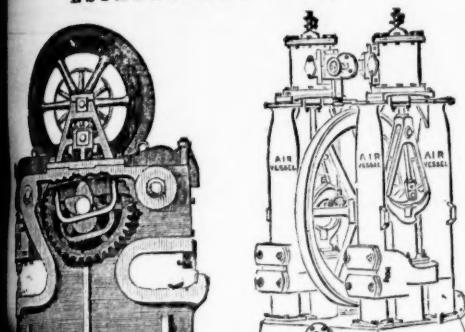
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No. 2195.—VOL. XLVII.

LONDON, SATURDAY, SEPTEMBER 15, 1877.

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PARIS, ORDER OF THE CROWN OF PRUSSIA. FALMOUTH,
BRONZE MEDAL, 1867. SILVER MEDAL, 1867



FALMOUTH,



SILVER MEDAL, 1867

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the
Geographical Congress, Paris, 1875—M. Favre, Contractor, having
exhibited the McKEAN Drill alone as the MODEL BORING MACHINE
for the ST. GOTTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland
Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gotthard Tunnel, where

THE McKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecutive weeks, ending February 7, was 24-90, 27-60, 24-80, 26-10, 28-30, 27-10, 28-40, 28-70 metres. Total advance of south heading during January was 121-30 metres, or 133 yards.

In a series of comparative trials made at the St. Gotthard Tunnel, the McKEAN Rock Drill continued to work until the pressure was reduced to one-half atmosphere ($\frac{1}{2}$ lbs.), showing almost the entire motive force to be available for the blow against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these Machines for the SEVERN TUNNEL; the LONDON AND NORTH-WESTERN RAILWAY for the FESTINIOG TUNNEL; and the BRITISH GOVERNMENT for several Public Works. A considerable number of Mining Companies are now using them. Shafts and Galleries are driven at from three to six times the speed of hand labour, according to the size and number of machines employed, and with important saving in cost. The ratio of advantage over hand labour is greatest where the rock is hardest.

These Machines possess many advantages, which give them a value unapproached by any other system of Boring Machine.

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The SAME Machine may be used for sinking, drifting, or open work. Their working parts are best protected against grit and accidents. The various methods of mounting them are the most efficient.

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Has only two moving parts—thus ensuring freedom from derangement, and is absolutely self-feeding.

Is excessively light, and can be carried by one man, who can with the No. 1 size (weighing only 35 lbs.) drill 40 holes $\frac{1}{2}$ in. diameter and $1\frac{1}{2}$ in. deep per minute, in the hardest Aberdeen granite for splitting purposes.

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DRESSING all METALLIC ORES. Dressing-floors having these Machines pos-

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BY DRESSING-FLOORS IS REQUIRED.

3.—FROM 60 TO 70 PER CENT. OF THE LABOUR IN DRESSING, AND
FROM 5 TO 10 PER CENT. OF ORE OTHERWISE LOST, IS SAVED.

4.—THEY ARE THE ONLY MACHINES THAT MAKE THE ORE CLEAN
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They have been supplied to some of the principal mines in the United Kingdom and abroad—viz.,

The Greenside Mines, Patterdale, Cumberland; London Lead Company's Mine, Darlington, Colbry, Nanthead, and Ballyhope; the Stonecroft and Greystoke Mines, Hexham, Northumberland; Wanlockhead Mines, Abington, Scotland (the Duke of Buccleuch's); Bewick Partners, Haydon Bridge; the Old Darren, Eggar, mwyn, and Ystumtud Mines, in Cardiganshire; Mr. Beaumont's W.B. Mines, Darlington; also Mr. Sewell, for Argentiferous Copper Mines, Peru; the Bratberg Copper Mines, Norway, and Mines in Italy, Germany, United States of America, and Australia, from all whom certificates of the complete efficiency of the system can be had.

WASTE HEAPS, consisting of refuse cherts and skimpings of a former washing, containing a mixture of lead, blende, and sulphur, DRESSED TO A PROFIT.

Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middleton-in-Teesdale, by Darlington, writing on the 20th March, 1876, says—"The yearly profit on our Nanthead waste heaps amounted last year to £2000, besides the machinery being occupied for some months in dressing ore-stuff from the mines. Of course, it had been wholly engaged in dressing waste; our return would have been greater; but it is giving us every satisfaction, and bringing the waste heaps into profitable use, which would otherwise remain dormant."

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines, Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—"I have much pleasure in stating that a full and superior set of your Ore Dressing Machinery has been at work at these mines for fully a month, and each day as the moving parts become smoother, and those in charge understand the working of the machinery better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply, and satisfactorily than by any other method."

Mr. BAINBRIDGE, speaking of machinery supplied Colbry Mines, says—"Your machinery saves fully one-half on old wages, and vastly more on the wages we have now to pay. Over and above the saving in cost is the saving in ore, which is a.t. much short of 10 per cent."

GREENSIDE MINE COMPANY, Patterdale, near Penrith, say—"The separation which they make is complete."

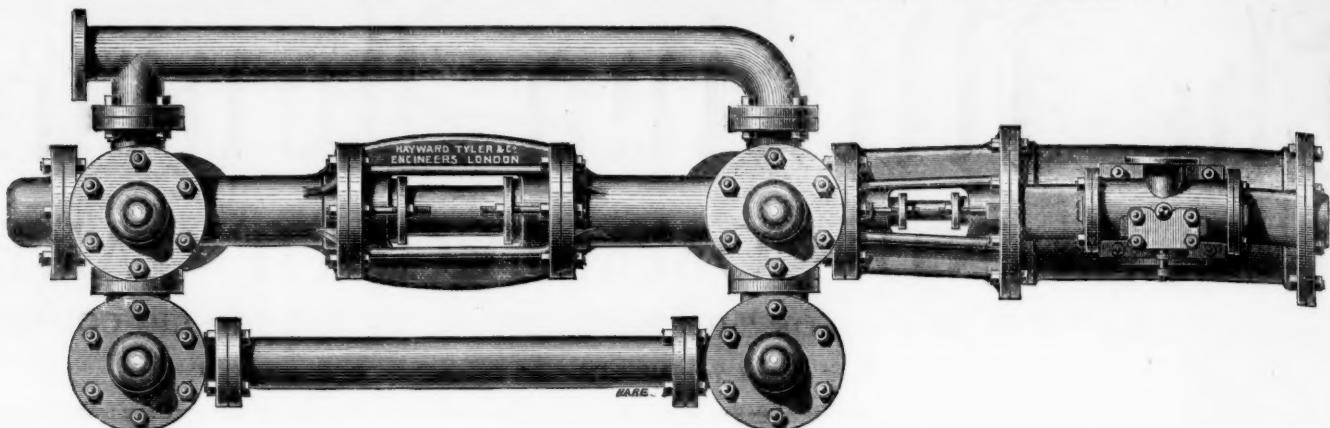
MR. MONTAGUE BRALE says—"It will separate ore, however close the mechanical mixture, in such a way as no other machine can do."

MR. C. DODSWORTH says—"It is the very best for the purpose and will do for any kind of metallic ores—the very thing so long needed for dressing-floors."

Drawings, specifications, and estimates will be forwarded on application to—

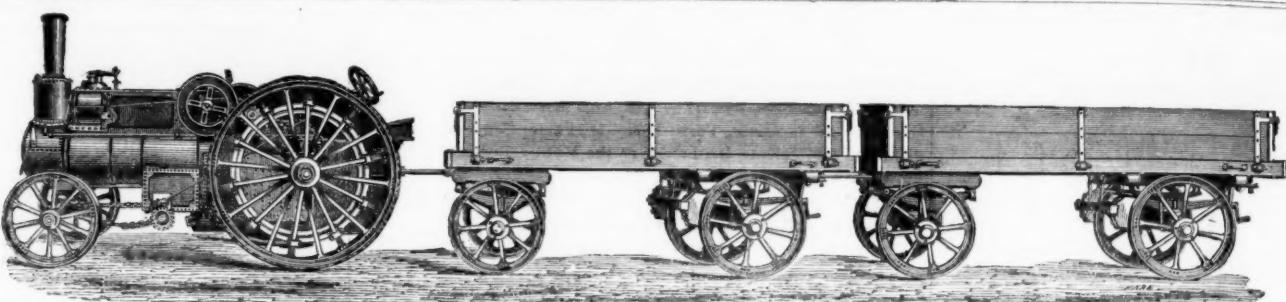
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"7. Its greater power is some FORTY PER CENT. in favour of the Ingersoll."

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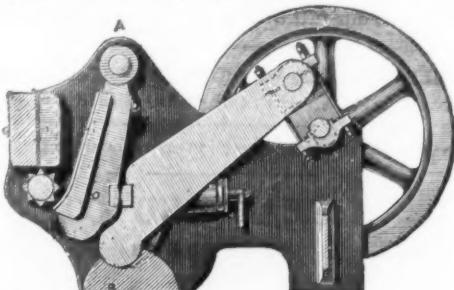
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Machines with combined Vertical Jaw and

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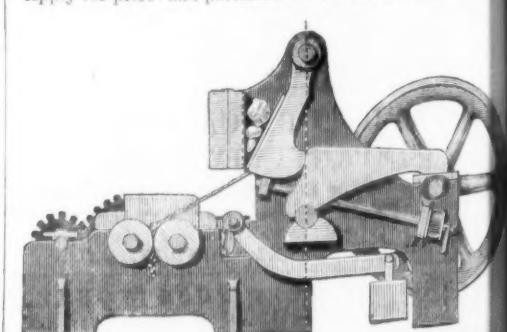
Simple Machines, with plain Vertical Jaws, without Roller.



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every description of MACHINERY USED IN CHEMICAL WORKS.

SUN. 15. 1877.

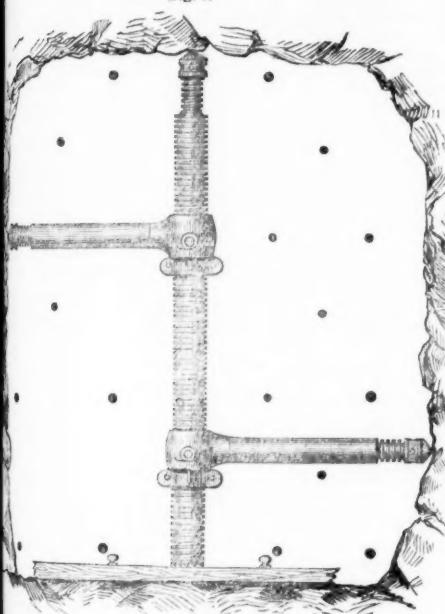
Original Correspondence.

ROCK-BORING MACHINERY—No. VII.

CARRIAGES.—The effective working of boring-machines is more dependent on the construction and weight of the carriage on which they are mounted. If the face of a heading is of moderately small but distinct portion of the face. Further, if time, as it always should be, is of primary importance, the work of fastening the carriage to the sides or roof of the level may be dispensed with; in such case, the carriage must be of sufficient weight to absorb the shock arising from the machines when in full operation. When a large number of men are employed, their labour being entirely in connection with the boring machines, it is important to save from 20 minutes in fixing the carriage. If four "cuts" or "advances" are made in 24 hours, as at St. Gotthard, the time taken in simply fastening and unfastening the carriage would be 12 hours, or 12 hours weekly. On the other hand, a heavy and cumbersome carriage in a mine level would be scarcely admissible, nor is it of equal importance in point of economy, as in cases referred to, since it must always happen, with the exception of some particular work, that mine headings will be driven by men, unassisted by the "fast speed tackle" employed in rail-road and special tunnelling. For mining purposes, therefore, the carriages have suggested a lightly-formed carriage, with means of fastening it to the sides or roof of the level and vertical or horizontal bars, constituting a stand, for carrying the machines. In running boring machines it is either necessary that the tools have very easy play—in other words, be free from any restraint like the line of the hole—or that the machines are attached firmly to the retaining bars, so that the tools cannot deviate from the direction of the hole. If, in the latter case, any movement from its position of the machine should occur the tool will drag and fall on the side of the hole, the force of the cutting blow will be more or less dissipated, or, perhaps, the tool will "bind" upon the machine, while a tool worked in this way, deprived of power and rounded at the point, will form a taper, not a straight, true hole, and cause the next tool with its fresh cutting edge to be used tight in the taper part of the hole referred to. The construction of the carriage and attachment of the boring machine is, therefore, a very important part of rock-boring apparatus.

CARRIAGES.—The Mont Cenis carriage held the boring machine, and withstood the reactive force of the blows by its weight. This weight was 17½ tons. While the machines were worked one or two of the workmen frequently placed a piece of timber between the carriage and roof, to prevent a backward movement of the former. The boring machines were articulated to the carriage, and allowed to play to and from the line of the holes. At the commencement of the heading a carriage weighing 4 to 5 tons was employed; but this was found too light to resist the force of the blows, and a heavier carriage was subsequently adopted:—

Fig. 6.



STANDS.—One of the stands employed by myself for running headings is composed of a vertical bar and two horizontal bars (see Fig. 6). The vertical bar is clamped to the roof during the operation; the side bars are set so as to require but once to bore the whole number of holes. In order to use this with ease and facility; it is taken to and from the fore-end of a small trolley arranged for that purpose. This trolley is fitted with a small platform for holding the boring machine, as well as an air cylinder having one inlet from the air main, and two pipes connecting each machine by means of a short piece of hose. The arrangement of this stand is such as to admit of the holes and blasting the ground in vertical or horizontal rows, as may be desired.

Another form of stand sometimes employed is formed of two vertical bars, set a given distance apart. On each bar a machine is clamped, and radiates right and left, in order to bore the shot-holes in the face. In order to perforate each half of the face the bars are raised, lowered, and clamped to the bars. This form is adapted for removing the ground by means of vertical

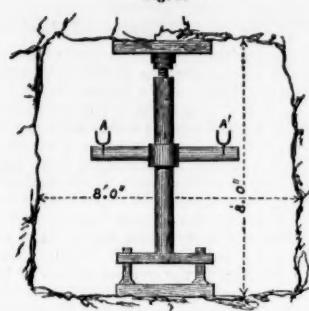
Fig. 7.



The general form of the stand in use at the Severn Tunnel at Port Talbot, and which carries two of the Geach boring machines, is shown in Fig. 8. It consists of a platform carriage—a vertical and horizontal bar intervening between the end of the screw and the rock. The vertical bar is about 5½ ft. long. The horizontal bar, from end to end, is set about 4 ft. from the sole of the level. In this manner the machines on the bar at A' A' angle up and down and can angle on the face and bore the necessary shot-holes. The carriage for mounting four machines is 10 feet long, and is clamped to the horizontal bar. The boring machines are

extensively used on the Continent. In this carriage the ends of the boring machines are attached to vertical bars, so placed that the

Fig. 8.



of considerable weight. It is simply run to and from the heading with the machines on the bars and holding frames.

Figs. 9 and 10 are diagrammatic illustrations of stands for carrying four and six boring machines. The horizontal bars and machines are so placed as to allow of the perforation of the forebreast without altering their normal position.

Fig. 9.

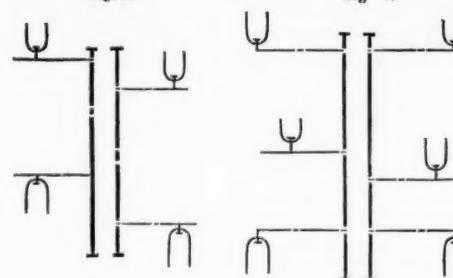
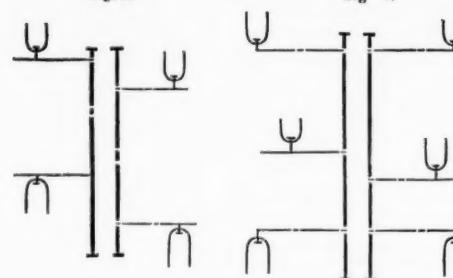


Fig. 10.



STRETCHER BAR.—This bar is simply fixed against the sides or roof and floor of the level, by merely lengthening it when in position. The machine is fixed to this bar by means of a clamp, which when loosened allows it to be directed at the desired angle. In order to use the stretcher-bar the machine must be very light.

SHAFT-SINKING STANDS.—Hitherto most of the boring machines employed for shaft-sinking purposes have been mounted on a stretcher-bar. In the year 1874 Dubois and François constructed a stand for sinking a pit 10 ft. diameter at the Werister Colliery, Belgium. The stand, 24 ft. long, was formed of a wooden framework constituting its upper part, two vertical bars extending from the framework to the bottom of the shaft, and two horizontal bars, set 11½ ft. from the floor of the shaft, for carrying the machines. The horizontal bars were not fastened to the sides of the shaft, but the ends were clipped in an iron ring attached to the under part of the wooden frame. In the year 1876 a vertical bar, with two rotating arms, the latter carrying the machines, was introduced at Minera. The bar was 12 ft. long, and during the sinking operation was kept in position by clipping it to a piece of timber fixed across the shaft, which timber subsequently served as the "dividing piece" between the winding and pumping part of the shaft. Later the vertical bar was increased in length from 12 ft. to 18 ft.

JOHN DARLINGTON.

STAMPING G.

SIR,—The courteous criticisms of your correspondents upon my letter, published in the Supplement to the Journal of Aug. 18, on the subject of Stamping Machinery, requires a reply. In tabulating the valuable figures supplied by your correspondent "X." I did not venture to insert any estimate of my own of the power required by the respective stamp mills, knowing how fallacious such calculations might be; as, apart from other incidents, there is the important one of friction, which varies according to the good or bad construction of the working parts, and the good or bad condition in which the stamps are kept by the attendants at the various mills, knowing that the same machine will vary its amount of work and consumption of power from these causes. I preferred, therefore, to tabulate the figures given in order to facilitate comparison on the part of your readers, and in doing so I merely stated that the 1½-horse power would amount to an average of 57½-horse power to the 100 tons of rock stamped by the American mills in the 24 hours.

I may unwittingly have understated the power required by the American stamps, and Mr. Cox may be nearer the truth when he calculates that the mills, Nos. 1 to 9, take in all 15·65-horse power, which gives an average of 1·74-horse power each, or equal to 91·91-horse power to stamp 100 tons of rock in 24 hours. In such case the comparison will be still more in favour of the stamp No. 10.

Of course, the matter of the waste of power by friction is a serious one in all machinery, and particularly in stamps, where the guide rods and bushes are sources of constant trouble in this respect. The Elephant Flexible stamps have exceptional advantages above all other stamps known in regard to this waste of power by friction, owing to their few working parts and the absence of guide rods, bushes, and tappets, the friction and wear and tear being thus reduced to a minimum.

Mr. Cox is in error in supposing that the Elephant stamp heads travel at the rate of 140 ft. per minute; the rate is actually 280 ft. per minute, being 140 ft. up and 140 ft. down each minute.

The force of the blows being in the direct ratio of the squares of their velocities, multiplied by the weight of the stamp, is well illustrated by the extraordinary range of power contained in a machine which is capable, by merely varying the speed, of imparting from the gentlest tap to the most shattering blow at the will of the attendant. Hardness of the rock is no difficulty to a machine so constructed. As regards the points on which Mr. Cox asks information, the rock stamped was hard granitic elvan. The other particulars, doubtless, Messrs. Willoughby Brothers, the makers of the machines, will gladly supply.

M. P.

COLLIERY MANAGERS' ASSOCIATION.

SIR,—I would not have troubled you on this subject at present, had it not been for the uncalled-for statement in last week's Journal by "Manager"—"that a council of the quality required cannot be formed by prickings promiscuously among the holders of certificates of service, which are but too well known to be no guarantee for technical ability."

From this statement the inference is that the knowingness of a guarantee for technical ability consists in the knowledge of the possession of what the Legislature has called a certificate of competency. This is a guarantee of technical ability. I wonder if it never occurred to these people that the name was given by the Legislature as a distinction only from those who were entitled to certificates from service. The appellation competency is in itself wrong, and grievously insulting to those who at the time of the passing of the Act were managers of collieries, and had there been such an association as the one now proposed would not have been allowed to be incorporated in an Act of Parliament. Were the certificates called "Certificates of Examination" it would be understood what they are. I have some knowledge of examinations and the examiners, and I have reason to believe that were every member constituting the examiners under the Act asked as to the competency of those who have passed their examinations, they would, I believe, reply "that the candidates had passed their examinations, but as to their competency to manage collieries they could not say."

In consequence of the term "competency," all concerned are in

a false position—the examiners, the possessors, and the proprietors of collieries.

It is likely there are few men who have as many men they have trained holding the position of managers of collieries as the writer; amongst them are some six men now holding "C. C.'s," not one of them a whit better, but four of them a good deal worse.

And as to the guarantee of technical ability by the possession of a "C. C." it is, like the whole thread of it, a misunderstanding. I know such a possessor who to this day, in the effulgence of his ability, cannot, and never could, inform you if relating something he had seen in a newspaper whether it was an article, a paragraph, or correspondence. I will not lengthen on this at this time, except just to state that this very day I have had an application from a holder of a "C. C." for manual work. I might though be pardoned asking, Who are they that have supplied the mining literature before and since 1872? — ANOTHER MANAGER.

THE TECOMA MINE.

SIR,—Some six months ago there were three mines in the list all about 5s. to 10s. the 10^t shares. I mean the Flagstaff, Last Chance, and Tecomá. Since then Flagstaff has improved to 3s., and Last Chance to 1s., whilst Tecomá, after advancing to 1s., buy-ers, remains at 1s., sellers. I would point out to anyone thinking of investing in this stock, or to any old holders hesitating about averaging shares that may have cost them high, the inadvisability of delaying purchasing or averaging while shares are as cheap as they are, and when a short wire from the mine may at any moment make prices tip up, as prices have already done in the case of Flagstaff and Last Chance. I would also point out that Flagstaff and Last Chance stock had its rise in one day. For my own part I have several hundred shares, bought low, which I have put to sleep for the present, quite satisfied in my own mind to wait for the turn of luck which I believe Tecomá, like the two other mines I have named, will have shortly.

ONIX FARNHAM.

THE SAN JUAN SILVER MINES.

SIR,—Since my last appeared in the Journal, inviting correspondence regarding the San Juan Silver Mines, I have seen some of them, and been, therefore, able to answer with confidence the numerous letters I have received consequent upon your publication of mine. I have crossed the main range twice into Silverton, and seen the best mines of the Animas district, of which village is the centre, and have been perfectly amazed at the wealth of mineral property lying there unproductive, owing to want of capital. One thing I may mention which will illustrate that fact—there are hundreds of tons of ore, running 30 to 50 ozs. of silver to the ton, lying about the dumps of the mines, and which will not pay to carry on pack animals three to six miles to the smelt mills. There is only one smelt mill in Silverton, owned by Greene and Co., and I think they give as much for the ores as they possibly can and make any profit. They had to bring all their machinery by wagon from the end of the railway (180 miles), and over a range of mountains 12,200 feet above tide water, at the summit of the Cunningham Gulch Pass, where they cross. In consequence they are running at immense expense, and can give but comparatively low prices for the ore; in fact, I have often heard the miners say that "100-oz. ore" is the lowest it will pay to take out.

Galena Mountain, six miles from Silverton, is full of immense veins of galena, carrying about 60 per cent. of lead, and running from 30 to 50 ozs. of silver to the ton, which will not pay largely to work, and why? Simply because there is no road from the outer world over the range, and the lead, which with a road would pay the carriage of the bullion to St. Louis refining works, is worthless. You will then say, naturally, "If there are such riches there, and a toll-road was built, there would be enormous travel over it, and it would not only revolutionise the mining district but pay largely in tolls; why, then, does not someone who has seen this built it?" It is easily explained. An Englishman of ample means, at the recommendation of a friend who lives here, came out last May to build this very road from Antelope Park to Silverton (40 miles). A responsible contractor and engineer offered to build it in three months for \$25,000; another responsible man offered to take the road on lease for five years, giving the owner 15 per cent. per annum, payable quarterly in advance, and going under heavy bonds to fulfil his agreement; and the towns of Silverton and Del Norte combined would have given him a bonus of 200 lots in the embryo town of Silverton, which lots in three years would be worth at least \$100 each. One would imagine an Englishman would think this a tolerably good investment of 5000£.; so did this one till he saw the mines, and determined them to do what many had done before him—put his money into mines, and wait for someone else to build the road to make them worth anything. And thus it has gone on for four or five years.

The size and richness of the veins are certainly tempting, and men "lose their head." But if some "level-headed" man of sufficient means were to come here he could buy up mining property and town lots for a song, and then build the road and make them worth four times what he paid for them the moment the road was completed. Why, I saw 200 tons of ore on the dump of the Aspen Mine, on Hazelton Mountain, three miles from Silverton (the ore—galena—carrying 60 per cent. of lead, and running about 175 ozs. silver to the ton), which the moment a road was completed would be worth an advance of just 30 per cent. Greene and Co. offered a lump sum of \$15,000 for one pile of 100 tons, which was refused by the owners, they preferring to take schedule prices. The builder of the road could have made upwards of \$9000 by just buying up this ore, and holding it till the completion of the road, when the lead would have paid for shipping it.

Another trouble is that each mine has too many owners. Year by year the original discoverers have hung on, waiting for the road, and not getting it, and outsiders have bought in at a small sum to enable the others to keep themselves in "grub," and as sure as there are four or five owners they disagree, and will neither work nor allow their mine to be worked. I visited one mine, five miles from Silverton; the vein had split, and there was a 3 ft. vein of solid mineral on each side the "horse"—6 ft. of mineral when they come together, which will occur, judging from the dip, at about 50 ft. in depth. This was also galena, and a mill run of the ore, unassorted, gave 50 ozs. silver to the ton, and a lot of picked ore from the same 268 ozs. The veins were cut by a tunnel 100 ft. in, and the mine in first-rate shape. What are the owners doing? Sitting in the cabin at the mouth of the tunnel, eating their "grub," and doing nothing because they have disagreed. Greene and Co. offered to mine it, and give them \$5 per ton royalty. No, they would not do that; the ore was "richer lower down;" then Green and Co. offered them a sliding scale of royalty, commencing at \$5, and increasing as the ore increased in value; but they would not do that, and there lies one of the finest mining properties I ever saw unproductive. Of course the owners are every minute expecting the everlasting capitalist to come round the corner and buy them out. The output of that mine if properly worked would be 20 tons per diem, and if a smelter were put up to treat the ore, there are a dozen galena veins all round it which would be worked, and their ore sent there to be treated. Mount Snelles, one day's ride from Silverton, is beyond doubt, however, the richest and best district in the San Juan country; free milling ore carrying ruby and brittle silver, and plenty of veins of argentiferous galena besides, and I am now on my way to visit and examine it. The Wheel of Fortune is the best known and developed mine there, and they are sending the ore by pack animals to Van Giesen's lixiviation works at Lake City to be treated, at a cost to the miner of \$40 per ton for milling, and the same amount per ton for carriage. A lot of 20 tons just received there, when sampled and assayed, showed 800 ozs. silver to the ton.

No work of any account was done in Mount Snelles since last winter, as it is quite a new district, but all the richest ores I have assayed have come from there, and it is being extensively prospected this summer. Works are badly needed there. No trouble about suitable fluxes, and abundance of timber and water-power. No coke as yet, but large veins of coal have just been discovered near by, whether suitable for coking or not I cannot say, but charcoal is cheap. I am going in there with my tent, pack animal, "grub,"

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and tools, and shall stay a month and examine the Mount Sneffels district thoroughly, and shall be glad, as I said in my last, to answer all enquiries free of charge. I gave you my London references in my former letter. The troutfishing here is the finest in the world; plenty of bear, big-horns, deer, and antelope; grand scenery and fine air. All I want is for some of my countrymen, miners of experience, to come here and see for themselves. It only takes 15 days from Liverpool here—i.e., with an average sea voyage of 10 days. September and October the best months. W. WESTON.

Del Norte, Rio Grande County, Colorado, Aug. 4.

THE FRONTINO AND BOLIVIA COMPANY.

SIR.—For some months past the Silencio Mine belonging to this company has given signs of extraordinary richness. Previous to the water getting in the mine the yield at the bottom of the shaft was 41 ozs. per day, and 75 ozs. at the bottom of the engine-shaft a little distance away. The water is now pumped out, and the mine, I suppose, will begin to return ore. Rich as this mine is I am of opinion that the Palmichala will some day beat it. In an old report Mr. White says:—"Two mines on the borders of the company's property (Sacred and Cristales) yield—Sacred, 260,000/- profit on an outlay of 3000/-, and Cristales 71,000/- profit in 11 months. The mine Colombia is close to these, and very rich, and the Palmichala veins of ore run from these mines." That Palmichala is a good mine was proved by the tributaries. I cannot now say the yield per ton. If this mine does not prove as good a prize as the least of the two I have named I shall be surprised. Take a later report than the one I have quoted from—August, 1874. In this Mr. White says:—"Bolivia, Mira, Cristales, Palmichala, Silencio, and Colombia, increase in richness as they go downwards." If this was so in 1874 why should it not be so in 1877? When Mr. White penned this report in 1874 he did not foresee what a good mine Silencio would prove, but seemed to think more of the Palmichala, and from a very careful study of the reports—old and new—I shall expect when the Palmichala is well opened out to see it beat the Silencio.

OLD SHAREHOLDER.

THE FRONTINO (ANTIOQUIA) COMPANY.

SIR.—I learn from the report recently issued by the directors that at the forthcoming meeting, to be held early next month, some plan is to be arranged to pay off the debt due from this company to the Frontino and Bolivia, amounting to about 5000/- Now, as there can be only one way of meeting this claim if at once pressed, and that is by the issue of debentures, I hope the shareholders will not be too hard on the weaker company. The Frontino and Bolivia is doing remarkably well, and can afford to do without the 5000/- for a time; at least until the Antioquia has got into paying ground, which, in all probability, they soon will do. Without forcing this money there is sufficient in hand to pay a dividend of 1/- per share on the Frontino and Bolivia shares. It is generally believed that nearly all the Antioquia shareholders are also Bolivia shareholders, but this is not quite correct. There can be no reason why the Bolivia should lend the Antioquia Company the money for nothing, as the prospects of the latter company are so good. I see from the last report that 1/- per ton may be looked for.

A SHAREHOLDER.

NEW QUEBRADA COMPANY.

SIR.—I read with great interest the two letters which appeared in last week's Journal respecting the above company, and the fact of having myself been at the Aroa Mines so recently as June last may be sufficient reason for encroaching on your valuable space. Much has been written and said respecting the report by Mr. John Darlington, who I met at La Luz early in April last, but whatever inferences may have been drawn therefrom I can confidently say that the condition of the company's property is most promising, but it necessarily follows that constant and careful attention is required on the part of the management in opening up and developing the mines, also that grave responsibility rests with the board as to whom they intrust the administration of the company's affairs in Venezuela, and their selection has not always been of the most desirable nature, but I trust from the present they will be more fortunate. On each occasion when I visited the mines was I accompanied by Capt. John Harvey, who represented Messrs. John Taylor and Sons, in certain explorations which we were conducting on the adjoining property, and who had been for many years the manager of the Cobre Mines in Cuba, therefore I had the advantage of learning the views of an experienced miner, but unfortunately in consequence of instructions from London we were not permitted to enter the workings of the Aroa Mine, and so I can only speak as to what I saw at surface; notwithstanding this, however, we were able to form a tolerably clear opinion on many points of interest. As regards the ore on the floors, consisting of huge piles covering a considerable area of ground, a great proportion is yellow sulphurite, and there are also large quantities of the higher class or ruby ore, but I must say that of all the mines I have visited in various parts of the world I never yet beheld such disregard displayed as far as the dressing department is concerned. From personal observations I discovered that the ore as brought out of the mine in tram-trucks is shot out on to the heaps from which the sacks are filled and conveyed by donkeys to the railway at La Luz, thence to the coast and shipped without being submitted to even rough hand picking, the consequence is that a large percentage of kilas and lodestuff is intermixed with the good ore, thus greatly lowering its value, increasing the cost of transit, and injuring the reputation of the mine. This could easily be obviated by the employment of women and children to pick it over, as in Cornwall. Respecting the yellow ore, of which there are such enormous quantities now at surface and yet to be won, I am satisfied that if melted and reduced to regulus it would pay well, and this should be put into operation without any unnecessary delay.

I went underground at the Titiara and Armarauqua Mines, which present very favourable indications, but are not being worked by the company, and am confident that the lode here, which runs due north and south, is the same as that now being worked in the Aroa Mine, and therefore by following the lode from Aroa towards the Titiara Mine a vast tract of mineral yet remains to be opened up, and that those who imagined that Mr. Darlington's remarks as to the quantity of ore available were intended to convey that it was the total amount of the company's wealth may dispel their fears, and rest assured that if the present management only follow Mr. Richardson's excellent and miner-like example of opening up in advance they need have no anxiety for the future.

The works now in progress at the mine are being conducted by Mr. Henry Francis, and I am sure that a more conscientious and intelligent manager it would be difficult to find, but at the time I was there he had too much work thrust upon him, having not only to perform the onerous duties of captain, but to act as purser, and do nearly all the office work at the mines, whereas at Tucumán the Quebrada and Bolivia Companies have a large staff, and I really think that some arrangement might be made to relieve Mr. Francis, in order that he may have more time at his command to attend to the mining operations. Seeing that the interests of the two companies are identical, I strongly advocate an amalgamation if it can be arranged.

I could write a great deal more, but must not trespass on your space. Suffice it to say that the railway is fast approaching completion, and although I much regret that it is not a 3 ft. gauge instead of a 2 feet, I certainly consider that it will thoroughly answer its purpose for some time to come. At a future date, when both companies have got into full operation I have no doubt that it will be advisable to widen the line, as apart from the copper to be brought down, an enormous amount of coffee and other produce from Barranquilla and other districts in the interior will be sent over the line to the coast, but it is very important that the present freight should be reconsidered, as there is a danger if this is not done that a large source of income may be lost, as the planters and merchants regard the present charge as being exorbitant, and threaten to revert to the old route, by donkey carriage, to Puerto Cabello, via San Felipe. I may remark that during our stay in the country both Capt. Harvey and myself enjoyed excellent health, although we un-

derwent much fatigue and exposure in carrying on our explorations in the Buena Vista Mountains.

W. W. BIRD,
Great Winchester-street, Sept. 13.

THE HULTAFALL (SWEDEN) MINING COMPANY.

SIR.—Pressing engagements have prevented an earlier completion of my examination of the samples of Hultafall lead and zinc ore, which I took from the heap that Mr. Batters showed me at the mining office in London. I now beg to hand you the following report:—

By hand picking a considerable assortment may be effected with ease into ore containing a large proportion of galena with a small quantity of blonde, into ore containing a large quantity of blonde with a small quantity of galena, and into ore containing nearly equal quantities of each. The ores can be easily crushed and prepared for the continuous system of dressing by jiggling and other apparatus, which is now being extensively and successfully employed for the treatment of similar ores. There will be no difficulty in dressing the ores so as to produce in the case of galena 70 to 73 per cent. of lead, and the blonde so as to produce about 54 per cent. of zinc, which by calcination may be increased to about 63 per cent.

I have experimented on the calcination of the blonde, and found no difficulty in reducing the sulphur in it from 29.65 to 14.33 per cent. I have no doubt that with a slight modification in the construction of our calciner it may be most advantageously employed for the treatment of this ore.

The sample of calcined blonde from the Vieille Montagne Company's works with which you supplied me, I find to contain 24.43 per cent. of sulphur. A sample picked out as containing much galena, with little blonde, produced—

Lead	49.60 per cent.
Silver	10.22 ozs. per ton.

Another sample containing much blonde, with a little galena, contained—

Silver	5.68 ozs. per ton.
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By vanning I easily separated the ore into—

Galena	3.80 per cent.	70 per cent.
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Blonde	61.10 "	20 "
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Earthy matter	35.10 "	10 "
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Total	100 per cent.	100 per cent.
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I have carefully gone through the reports of Messrs. Waters, Southey, and Gregory; it is evident from their careful statements that you have a very valuable property, which requires only prompt and efficient management to produce very profitable results.

Portland-square, Plymouth, Sept. 8.

ROBERT OXLAND.

HULTAFALL (SWEDEN) MINING COMPANY.

SIR.—As one of the earliest advocates of the Hultafall Mining Company, I have great pleasure in submitting the following facts respecting the prospects of this undertaking:—

Capt. Waters states that from an average sample taken from the bottom of the mine, and washed by himself, the yield of lead was 25 per cent., and of blonde 50 per cent.; and as the company is at present putting up machinery to treat 60 tons per day, the inference is that it would yield 45 tons per day of dressed mineral, and making ample allowances—say, 30 tons, or one-half, at 25 working days per month, $25 \times 30 = 750$ tons of dressed mineral per month, of which one-third would be lead and two-thirds blonde.

Taking lead at 15/- per ton, as it contains upwards of 20 ozs. of silver to the ton, we have 250 tons, at 15/- £3750

Taking blonde at 4/- per ton we have 500 tons, at 4/- 2000

Total	£3750
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Deducting costs at the outside figure of 2000

Gives a monthly profit of	£3750
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As the capital of the company consists of 12,000 shares of 5/- each—60,000/-—this monthly profit would be equivalent to 75 per cent. per annum upon the gross capital, or 45,000/- annually upon 60,000/. This could undoubtedly be largely increased, and this result ought to be arrived at with vigorous working in, certainly, 12 months' time. The report is amply confirmed by Capt. Southey, of West Chiverton, and also by Mr. T. Currie Gregory. The present appearance of the mine fully corroborates these statements, and certainly the Hultafall Company bids fair to be one of the most profitable which has ever been brought before the British public. Van shares pay at the rate of 3/- 4s. per share per annum, and the shares stand at 32/- per share; it is not, therefore, too much to expect to see these shares attaining an equally good market price within the space of a very short time. In the present depressed state of markets it is difficult to make people believe that so good a concern can actually exist, but it is in times like the present that opportunities offer by which large sums of money can be made, which at ordinary periods cannot be secured.

W. H. BUMPUS.

Threadneedle-street, Sept. 14.

MINING IN NEW SOUTH WALES.

SIR.—The mining industry here is still "suffering a recovery," and unless some sudden unexpected "finds" take place is likely to do so for a time, whilst wool and meat keep their present high prices, and the consequent profits made by the banks enable them to give large and steady dividends, and pay high interest for deposits. Mining to really succeed requires the union of capital with enterprise, and the patience to wait for results, and when we are sufficiently adventurous and sensible to see this and carry it out our alluvial gold fields worked by hydraulics will rival the Californian ones, whilst our reefs evidently only want opening up at greater depths, as in all other mining countries, to yield as good results, for in the only two comparatively deep shafts sunk in the colony—the Star of Peace, Hill End, at the 690 ft. level, and the Great Victoria, at Adelong, at 800 ft.—really good gold has been struck, and with every appearance of improvement, and there are scores and scores of idle claims in the colony abandoned after sinking 50 or 100 feet because water came in, or the "shoot" pinched out, or the shareholders got impatient, which, with the outlay of 3000/- or 4000/- in deep sinking, would probably give large fortunes to the adventurers—in fact, we have done nothing more here as yet than "scratched" our reefs, and after scraping out the few hundred ounces near the surface, which were really only the indications of what was really worth working for deeper down in the solid "country" have jibbed at the "calls," and left off just when we ought to have gone on.

In COPPER there is a great deal of awaking up—in a quiet way as yet—through the railways now beginning to really open up the country, and so giving cheap carriage for the ores to the smelting works (about 90 miles inland from Sydney, where the coal measures finally break) at Bethangra, near the Victorian border to the southwest, some rich lodes have been partially opened up, and near Gundagai the Snowball Copper Mine is likely to prove a very great success, as in No. 1 shaft at 99 feet the lode is over 10 feet wide (yellow sulphurites), in No. 2 shaft at 70 feet the lode is 8 feet wide (black oxide and sulphurites), and in four other shafts going down in the lode blue and green carburets, &c. This was one of the abandoned leases during the collapse of the late mania, but the present manager (Mr. Sturt) had faith in it, leased it on tribute in conjunction with Mr. Peterson, of Hillend, and furnaces are now going up, a small township being formed, and every prospect of the proprietors making their "pile." There were but ten shares in it originally, and some of them were hawked about for 30/- each, and if Mr. Sturt had not stuck to his opinion and the work, and Mr. Peterson had not had the capital and courage to back it up, even such a property as this would have been now idle as one of the "swindles." Mr. Sturt has begun to open up lodes also at Mingrey Creek and Lanz's Creek, and his pluck and perseverance will probably open up a new field of wealth in the district, as it had hitherto been only a pastoral one.

The Cowflat Copper Mine, too, which is about the nearest to Sydney, and closer to the coal measures, is getting seriously to work again, and with the large lodes and rich bunches here and there can scarcely fail to be a splendid property when fairly opened up. Bensusan's Frogmoor also has its furnaces up at last, and is likely to be a success. The Pechwood and Goodrich I hear are also looking well, and alto-

gether copper is certainly coming to the front. Galena and gentiferous galena, though known to exist at Mylora (where a lode 18 inches thick in the side of a creek) and other places in southern districts, has never been worked by us here excepting a few feet, and putting down one or two "pot holes" then dropping it altogether, but as the geological formation there is scarcely any doubt of the lodes being there.

IRON.—Within 100 miles of Sydney, and alongside the road, there is a deposit of iron ores of various kinds, great thicknesses, of high quality, with coal in the same land, extending over 3000 acres, but capitalists here will not work it while bank rates pay 25 per cent. dividends.

COAL.—The demand both for the southern (Bulli) and Newcastle coal keeps up, and the Wallsend, Waratah, and other northern seam areas are reaping a rich harvest. Most of the known seam area has three distinct seams in it at different depths, and just lately a new one has been discovered in a gully at about 13 ft. above the surface (under a 20 ft. covering of conglomerate), which is over 13 ft. thick of splendid bituminous clean coal. Newcastle by rail, and only one mile from Lake Macquarie, mouth of which is now being deepened by the Government, three or four leases of the known Wallsend area have now been added to their virtual monopoly of this pick of the coalfield, and the continuous increase of steam traffic in the colony, and the rich coal field is doubtless a better property than a river port. Newcastle and Bulli districts.

Sydney, New South Wales, July, 1877.

R. D. ANDREWS.

ST. JOHN DEL REY COMPANY.

SIR.—It is a curious circumstance that the proprietors of the stamps and arrastres on the Praia at Morro Velho manage to get a good living out of the stuff that the late administrator Gordon, had got as much as he could out of. I suppose the schoolmaster knew no better. The same sort of waste went years at Don Pedro North del Rey till they sent a miner with a head there. The consequence is that the people who wash the river at Morro St. Anna for the gold the company cannot live at what they can now find, because the additional so admirably constructed preserve the gold for the company. The people who used to wash for themselves have come to work to assist the company. That is the way to do your work.

Ouro Preto, Aug. 17.

LIMITED LIABILITY.

SIR.—With reference to the subject of limited liability introduced by "J. H. R." I should like to express a decided opinion that these companies have, taken as a whole, been of no advantage to the country; in fact, that they have done much more harm than good.

1.—They have done much to cause an excessive over production injurious to trade, as "J. H. R." has pointed out. And both in the case of old concerns taken over and transformed companies and in cases where new companies were formed as regards old concerns taken over, many of them were worthless and worthless that they would ere long have died a natural death and their disappearance would have been a great relief to their neighbours. This wholesome clearance has been prevented by their having a new lease of life given them as limited companies. And in the case of new companies, too often there was no consideration as to whether they were really wanted, or their production could permanently be taken off at a profit. The primary object was merely to float the company, and, if this could be done, little else was cared for. Under the old system of enterprise new concerns would not spring up unless the men of them believed them likely to be permanently successful, then over production was found to occur in seasons of prosperity, when men's minds became too sanguine. How much was it likely under the limited liability system, when it became the sole business of a large class of people to float as many companies as they could, whether they were likely to succeed or not?

2.—The management of all ordinary businesses can never be well carried on by a board of directors as by private enterprise, therefore the introduction of this inferior system of management must act badly for the country. It is needless to dilate on the Even men of ability find it about as much as they can do to successfully their own business to which they have been trained to their lives. How then can any sane man, or body of men, do much at a large business entirely novel to them? It may be years before they are really masters of it. Some of the directors may have interests antagonistic to the interests of the company and may, in fact, have accepted their places, as I have known, for the sake of the business they hoped to get from the company themselves or their friends.

3.—These companies have done much harm to public morality both in their formation and subsequent management, and upon it, whatever injures morals will in the long run injure a company's prosperity. The misrepresentation and trickery so freely used in floating many companies have by this time been pretty exposed, and many people are now rather ashamed of the dirty tricks they took part in. As regards some of the most notorious companies, everything about them was base and demoralizing, swindling on the largest scale. The ordinary course of affairs something in this fashion. The vendors had a business when on its last legs. They agreed to sell it for, say, 20,000/- perhaps 7000/- was to go to the promoters and directors of the company. For the sake of their share of this plunder these promoters and directors were doing their best to persuade everyone that—even their dearest friends and relatives—to put their money in the new company. Again, the evil did not cease when the companies were formed. The new directors being ignorant of the business, and often residing at a distance, in many cases far from the power was left in the hands of the managers and foremen. And abuses were the natural consequence. There was a frightful waste of the money of the new company so lavishly subscribed. Some it seemed as though everyone in the neighbourhood, even generally honest enough, thought the limited company fair for cheating and over charging. A good deal of this has passed away now. As a permanent thing, however, I think the management by a board is not as favourable to good moral as private management. It is an old saying and a true that "A man has no conscience." The conscience of a board is, at any rate, to be the conscience of the least scrupulous among the directors. For the more honest will hardly take the responsibility of open doubtful practices which the other members say are necessary for the success of the business—especially if things are not prospering. A private trader can say, "I will lose a customer rather than that which I do not think right." But even among a few of them it becomes difficult to settle questions of this sort, and board it is still more difficult.

On the whole, I cannot help coming to the lamentable conclusion that, as regards the majority of the limited companies, the proprietors who have sold the shares, have all been wasting time and rather doing harm than good. As to the promoters, they would have served their country better if they had laid in the time or jumped into the sea. The country is not a penny the worse for the time spent in getting the shares, but the time is lost through all their work, but, on the contrary, poorer. They got money out of the pockets of the shareholders, but they gave the shareholders no proper equivalent for this money, in many cases they never intended to. Their career represents very antipodes of good, honest, useful work.

There are, of course, a certain number of limited companies every way good and sound, and others again which may be moderately good. The best results seem to have been attained by the limited principle has been cautiously applied to sound concerns. In these instances the old partners have retained the management of the business, and have no intention of running

and by far the larger part of the shares are held by them
N. Y.
of their workpeople or employees.

THE FUNCTIONS OF MINE INSPECTORS.

I have so uniformly concurred in your treatment of the question of Government Inspection of Mines that I venture to ask you to express my dissent from the closing observations you make in your issue of the 1st inst. on the suspension of the certificate of inspection at Dudley. Whilst you certainly concur in the suggestion you suggest that—"It is much to be feared that even the Government Inspectors and their assistants are also far below the standard in this respect, and that the neglect of the Government officials corresponds with the neglect on the part of certificated inspectors." And you proceed to insist on "a certain amount of supervision" on the part of those officers who would, I fear, in practice lead to a confusion of responsibility antagonistic to the object of inspection—the safer working of the mines. It is impossible for inspectors to exercise a really effective supervision. They can only suppose that they can relieve them of the obligation of preserving proper management and proper discipline. Government interference involves the great danger of weakening the sense of direct responsibility, and it would be mischievous to regard the local Inspector as a supervising authority.

RESPONSIBILITY.

THE MANGANESE ORE DISTRICT.

In taking a survey the other day on the banks of the Tamar—In taking a survey the other day on the banks of the Tamar field for English manganese—I found the din of machinery and the clattering of hammers going on with more than usual activity in the midst of the rural occupations of the country. Considerable advantage has been taken of the summer months to make the various extensions which were contemplated last spring at the end of the works. Perhaps the greatest and most needful renovation and change is that which has taken place at Bowden Down, an entirely new and substantial dressing-floors have been laid out over the place, and where some new apparatus of the improved description is being erected by the enterprising miners. The large manganese lode which was entered upon at the beginning of the year at Bowden Down has greatly increased in size, and it has been proceeded with, and promises to be one of the grandest lodes in this country. The manganese mines at Goginan are also yielding some beautiful results, which probably repay the large expenditure which has been slowly, but surely, going on there for the last few years. C. E.

SUCCESSFUL MINES, AND MINE CAPTAINS.

—Very highly appreciate the remarks of your correspondent in your valuable Journal of July 14, headed—"A man makes a good Capn." We are led to believe, and have done since, that it takes a man of experience, coupled with a sense of education, to work and keep afloat a poor mine, while, generally, a rich mine will take care of itself; but it is as your correspondent said—"Nothing succeeds like success." The paths of Mr. Dolcoath, and Mr. William Teague, of Tin-croft, are exceedingly easily traced up, back even from their day to whom your correspondent refers. And when we say we are not for getting hold of a good share of this world's goods, in a honourable manner, we can also say the men referred to, as others in a similar position, should consider themselves extremely fortunate in getting hold of good mines, as it is not the man that makes the mine, but the mine makes the man. Stockmen in regular dividend mines scarcely ever go into the accounts but that many faults of the agent are covered up, and unknown; while in a poor mine every penny or cent (as the case may be) of expense is investigated, as the same is coming direct into stockholders' pockets, who in many instances are but badly paid.

here situated some thousands of miles from the country of birth, and from which I have reference to in a mining point of view, from the very extensive and reliable information I have had from the *Mining Journal* for the last 30 years I often wonder what it is that, according to the amount of mineral reported by the different agents as coming from the different points of operation, many mines do not do better for the stockholders. The price of both tin and copper is very low, but we must also take account that not only are wages extremely low, but also the cost of mining materials. More particularly I have noticed of the Welsh mines when they are getting from 1 to 5, 6 and 7 fms. of lead per fathom. For instance, Tankerville returns have been from 150 tons a month. Roman Gravels returns are small, and very soon will, it is feared, do so seriously. I notice that he goes underground in each mine? I am told scarcely a month. Then, from whom do his weekly reports of the ground work and appearances come, and from whom does he what points to work or stop? How is it that at the bottom of the shaft at Tankerville he has such a long cross-cut to follow, if I understand right, his shaft ought to be in the lode he has sunk on the wrong part. Would it not be more safe to the stockholders of each of these mines to have a manager, and thereby enable each one to go underground at least twice a week instead of once a month? As it is very much of the opinion of your correspondent ("Miner") it will soon be said of the agents of Tankerville, Roman Gravels, and the agents of Dolcoath and Tin-croft Mines when they fall into a bad state.

A MINER.

THE LEAD MINING INTERESTS.

The reports from Hultafall continue not only satisfactory but further to strengthen confidence in the future. The discredited authorities who have lately reported upon the properties of the existence of immense stores of ores, requiring only simple machinery to render marketable. The erection of this with the construction of floors and the requisite paraphernalia, time. Hence the products can scarcely become realised and available for dividends during the current year, yet we are greatly desirous if during the year 1878 this company does not "cap" the value of the lead-producing companies recognised on the London market in respect to bulk of yield. Leadhills is opening out well, the returns monthly augment, still the price of shares decline. Roman Gravels fall off in products and market value. The pioneer does not encourage hope in the future, yet the mine is bouncy, and frequent changes. It would prove interesting to the reader to see in your valuable columns a diagram of the strata, showing the dip of the shale, and the lime rock particularly. Tankerville is good to purchase, and so is Ladywell; both, however, require time to mature and carry out the works. West and East Roman are well worthy the attention of the investing public; and are spiritedly worked by Capt. Southery, and present unusual prospects of advancing yield, though prices of shares rule low. Van proceeds as usual; it is unquestionably the first lead adjoining, the profits being close on 50,000/- a-year. The East Roman is well supported with funds, and the finance must be sound and healthy; but, as to yield, there is no guarantee, though in the opinion of many hope shines brightly for the future. Van Consols and Aberdaunant are two memorable cases of hysterical inflation. The first received a lavish expenditure of money, while the latter exhibits inanition from want of sustenance.

It is to be regretted that such properties passed into the hands of parties who know not even the rudiments of mining—or, at least, do not practice them.

The highly interesting letter of Capt. Absalom Francis, in last week's Journal, respecting the Esgair-fraith, one of the Cambrian mines, cannot but prove satisfactory to all associated with the mining interests, for it proves that Cardiganshire lodes require only manly and practical handling to ensure success. It was earnest perseverance that achieved success at the Van, and no less so at Minera, Lisburne, Great Laxey, Roman Gravels, Tankerville, Dylife, Leadhills, and Cwmystwith. It is also due to the management that the public look with lively hopes to the development of West Craven Moor, East Craven Moor, Pateley Bridge, West Pateley Bridge, Cwm Llanarach, and other progressive lead mines in Yorkshire and Carnarvonshire.

R. TREDINICK,
Consulting and Advising Mining Engineer.

Exchange, Coleman-street, Sept. 12.

CAMBRIAN MINES.

SIR.—I last week, in company with Capt. Glanville, inspected these mines, and now have much pleasure in being able to report as follows:—The Esgair-fraith engine-shaft has been sunk between 9 and 10 fms. under the 10, and before another month will be sufficiently deep for extending levels east and west on the course of the vein, which has improved in depth every fathom in sinking, and is now worth more than 50/- per fathom. The deepest part where it has been seen contains a lode of lead nearly 6 in. wide, solid, and the copper portion very rich, and standing by the side of the lead. The 10, east of the engine-shaft, is in a rich course of copper ore; the lode here as well as in the engine-shaft being embedded in the finest gossan I ever beheld. In the winze sinking under the 10, many fathoms to the west of the engine-shaft, and now down more than 5 fathoms under the 10, the lode is very rich both for lead and copper ore, and worth over 40/- per fathom. The lode coming towards this winze, and 50 fathoms to the west of it at the 20, is in a rich lode for lead; the width of the end is 4 ft. wide, but how wide the vein is at this point I cannot say, and it is right here to mention that I have in each instance valued that portion of the lode only which is being carried in the several bargains before mentioned, and I have no hesitation in saying you have a mine which when properly opened out is richer than any other in this county.

At Esgair-hir the lode in the new shaft south of adit level, and 70 fms. west of the bargain last described, is in a good course of lead ore, but they have not as yet cut through it, consequently its real value is not yet ascertained, all of it as it is broken goes to the crushing-mill for dressing. This rich course of lead ore is entirely in new ground, and you may calculate on having a rich mine here of itself, apart from the Esgair-fraith and the old Esgair-hir, where the water is now drained to the 20, and is being opened out with economy and dispatch, and the machinery being put into the best order for carrying out the requisite trials to get under the magnificent courses of lead worked above for hundreds of fathoms long. Goginan, Sept. 10.

HENRY BOUNDY.

MORFA-DU MINE.

SIR.—The easy terms on which payments (extending over a considerable period) for subscription to this undertaking are offered must speak in its favour somewhat, but it is not generally known that this property, the capital of which is very small (only 6000/- having been paid up out of a nominal sum of 11,250/-, which is about all that is required), is capable of returning the entire capital yearly by the sale of the valuable bluestone (zinc) alone, a shaft of 36 fathoms being sunk on a solid lode of ore, an engine erected, and the lode laid open. To sink the shaft is the only duty of this company in so far as the bluestone is concerned. The royalty is moderate, and no promotion money is paid. A large sale at remunerative prices is ensured to this property's produce, and immediate returns can be made. If these shares are offered to the public no difficulty could exist as to their being rapidly taken up. A valuable copper mine must also be opened up here, having all the Parry's Mountain ledges traversing the sett, especially those running under the great white rock. The extent of this area is very large, about 245 acres, and with such resources, expectations, present wealth, and when due consideration is taken of the rich locality, second to none, and of the small amount of capital, no mine can compare with the Morfa-du enterprise at this moment, especially when it is considered that an excellent stream of water is at hand, and a great demand for zinc ore exists. VIATOR.

WHEAL GRENVILLE.

RESPECTED FRIEND.—We are told that if the Czar of Russia had known the defence the "turbaned Turks" were capable of making the present awful and bloody war would never have been entered upon. I venture to speculate that if the managers of Wheal Grenville Mine had known what the past 18 months would bring to light, and, further, if they could have foreseen the attacks which would have been made upon them, they would never have gone forth to strive against the former managers, nor would they have hastened with so much alacrity and anxiety to instal themselves in their present somewhat unsatisfactory position. Week after week sees this luckless management assailed most grievously in front, flank, and rear (as the sons of Moloch describe it), and often by destructive weapons and projectiles furnished by themselves, in the shape of unredeemed promises and sanguine expectations not yet realised, thereby making the attack the more painful to the assailed, and showing the ready wit and ingenious arguments of the assailants. I am both by nature and creed mercifully and charitably disposed towards all men, not given to unseemly rejoicings over the misfortunes of my fellow creatures, but I am fain to acknowledge that I am moved to rejoice somewhat at the discomfiture of the Wheal Grenville Mine managers when I remember how sorely they smote their predecessors, whose discharge they laboured hard and unceasingly to obtain and did in the end succeed in; casting forth without one word of thanks or consolation honest and worthy men who it appeared had been both efficient and diligent in their duty to their masters. Nor can it be denied that the present overseers did fill the shareholders' minds with the belief that they, the said rulers, possessed an abundance of ability for the important places they sought to occupy, and that they would with all diligence and economy apply themselves to quickly putting the affairs of the company in a more desirable condition than could ever be hoped for under the old managers' oversight and control. Nor must we forget when one "F. L. A. T. Rodda" writing in the paper, smiting the new managers hip and thigh with his powerful denunciations and condemnation, how a certain person accused him of being a perverter of the truth, and suggested motives of malice and self-interest. Time hath shown, however, that the person's rebukes were undeserved, and that Rodda was truthful and of integrity, and much to be commended for the correctness of his views.

But, friend, there is a time for warfare and a time for peace, and my chief object in now addressing thee is to ask if thou dost not think that the time hath arrived to cease further reproof towards this unfortunate management. I perceive, friend, that thou art a worthy and right-thinking man, ever desirous to open thy columns to the free discoursing of either side of a question or matter, and, doubtless, thou art moved to feel as I do, and as every lover of just retribution must feel, that whatsoever censure is meted out to the present Wheal Grenville Mine management it is not undeserved, inasmuch as they showed no bowels of Christian compassion for those who came before them, nor have they fulfilled the promises which they made as it were with the trumpet of boasting and the clarion of conceit. But I will ask thee, friend Editor, if the humiliating posture they now stand forth in is not a punishment which sufficeth without further chastening? I am informed that a somewhat large proportion of the old shareholders have long since retired from the company, sorely sick at heart with the result of the change they were persuaded to consent to, and it is further assured to me that the chief shareholders at the present time are the managers themselves and their friends, who are men of substantial means, and can afford to indulge in the hazardous and expensive pastime of mine management. If they have elected to do this, why

should their pursuit be further interfered with? Neither thou nor I, friend, have a desire to join in their work, and I doubt not the general public will show the like reluctance and discretion. Therefore would I cease to visit them with reproof and judgment in the future, but leave them to their own inclinations, bidding them, however, take heed of further vain boasting of themselves, and to cease in their disparagement of the worthy men whom they have succeeded. Farewell. Thy friend—

THOMAS TICKLAR.

Birchin-lane, 11th, 9th mo.

BEDFORD UNITED MINES—LIMITED LIABILITY.

SIR.—During the last ten years of my residence here I have invested very considerably in mines—very heavily in Bedford United. The stake I hold in this mine has induced me to pay great attention to its progress. I endured the first five years of call making by resolutely facing the difficulties of getting through the hard and unprofitable ground, and have promptly paid all demands made upon me in the last five years, being encouraged to do so on account of improvements that have taken place, amounting I consider to great success. Exercising implicit confidence in the statements made by Capt. Phillips, I would remark that the estimated value of the reserves of the mine, amounting to 20,000/- upwards, as given by me in the Journal a fortnight since, were founded accordingly, and which I understand has recently been confirmed by very high authority—proof of which can be made by a practical inspection of the mine any day. I understood until recently that the late increase of staff was by mutual agreement, and was for the assistance of Capt. Phillips, and looked to see an increase of returns, presuming that increased agency meant more extensive samplings, and when about six months since the sampling was made 50 tons more than usual, and of very valuable ore too, my spirits were naturally exuberant. But how fickle are our joys—so soon to be disappointed—and I am led to ask the question why the ore is kept from market and calls made instead? I have no doubt your valuable Journal is constantly read by most, if not all, of the adventurers of this mine, and as it is always open for fair and legitimate discussion of mining matters, I wish it to be the medium of interchange of thought and advice respecting the best mode to be adopted for other's welfare. We cannot be communicating often by circular, neither is it convenient to attend the meetings in London in large numbers, hence the control is in the hands of a few only, and oftentimes solely in the hands of the secretary.

The question I want to ask is whether, now that "limited liability" is confirmed we are bound to accept it? I have no doubt there are those similarly interested as myself who are asking themselves the question—Must we pay 12,000/- to get the 20,000/- worth of ore in the mine? I feel most emphatically No. Then if I do not care to pay the 1/- per share demanded, or cannot pay it, must I relinquish, and so lose all I have contributed to bring the mine into its present position? I ought not to. Having consulted the most practical advice, and from mature calculation, I am convinced that the mine can be so managed as to pay us back most of our outlay within a very short space of time. If means to do this are not resorted to, cannot we claim our respective share of the value of the mine on being compelled to relinquish? I would suggest the mine being offered as a going concern, to be tendered for, whereby probably a large sum would be obtained to divide among the adventurers, or could not the number of shares be increased and offered to those of the proprietary as are most eager for further expenditure before making returns at a given price per share. First increase to 4000 or 6000 shares at 1/- per share, the whole of this amount to be called up before any division of profits is made. An arrangement of this kind would give security to those shareholders who are not able to continue paying calls, and save them the necessity of relinquishment. I should like to know the feeling of my friends on these matters, and cannot divest my mind of a great deal of suspicion respecting the object of recent transactions relating to this mine.—Tavistock, Sept. 13.

JOSIAH WEDGWOOD.

TRELEIGH WOOD MINE.

SIR.—From the letter of "Ex-Shareholder" in last week's Journal I find Mr. Horswell and Capt. Goldsworthy have been to the mine, making out cost sheet, &c., so that we may assume they have succeeded the late manager, but I understood Capt. Goldsworthy was there before, or it may be they brothers. I hope they may have a good mine there, and find no difficulty in turning the improvement to satisfactory results to the shareholders. By calling on the late manager to attend the next meeting for him to give all details, as "Ex-Shareholder" suggests, would satisfy all concerned in the matter. "Constant Reader," although he does not believe in rumours, evidently knows something strange, or he would not allude to "salted samples." I enquired of a miner what was the good or meaning of "salted samples," when he told me that it was likely to be prilled samples, and is generally practised by tributaries, who by so doing would get their earnings increased, but he says it is seldom practised by tributaries themselves now, but by someone concerned. I thought it was a ridiculous thing, but I am no miner, and cannot vouch for the above or the meaning of salted samples being correct. I will enquire again.

A CORNISHMAN.

THE MINES OF LLANRWST DISTRICT.

SIR.—Your Chester correspondent seems anxious to know whether there was ever a good mine in this district, and I thought someone would have answered him in the Journal of last Saturday. Although I have taken up my pen to make a reply to his query, yet I do not presume that it will be satisfactory to him, as I do not know what is his definition of good. You know, Sir, what one man calls good another may call something between good and bad, and it is well known also that under certain circumstances a thing may be bad, whilst under other circumstances the same thing may be good. Now, I think that this argument applies to the mines in the Llanrwst district. A great revolution has taken place in the mode of working them, and, of course that must involve capital, which your correspondent should take into consideration. I think it would be unkind and even unjust to reflect on the wisdom of those who have had the management of these mines in former times, as it must evident to anyone who has been residing in the place for any length of time, and has examined them carefully, that they did just as much as any others could do under the same disadvantages. In the first place, they had no capital, and hence their explorations had to be limited to that which would make immediate returns. And, secondly, they had to reduce the ore by hand, or some little machine called a crusher—as good as had been known to them—for more suitable for a malt mill than for what it was used, and then this stuff must be all jigged with a hand-sieve, a slow and expensive process, as everyone knows that has had anything to do with manipulating ores. If a mine paid for working under such circumstances as these no doubt your correspondent will come to the conclusion that that was "a good mine." That such has been the case with most of the mines in this district is acknowledged by all that know their history. In addition to this we have presumptive evidence bearing on the same point—the immense quantity of work done with little or no capital. Thousands of fathoms of adit levels are driven into the mountains, and tens of thousands of fathoms of ground stoned away, and I ask in the face of this can any man believe that they went on for centuries driving levels, sinking winzes, stoping backs, &c., had they not found the operation pay? It would be contrary to common sense and reason to assume such a position. Where could working miners and a few tradesmen find the money? for such were chiefly the adventurers in former times.

I think I have clearly shown that there has been more than one "good" mine here, but as there are different degrees of goodness, I will be satisfied, for the sake of argument, to take my position low down in the scale, so let me have a chance to rise. It is an old maxim "circumstances alter cases." Well, then, the favourable change in the external circumstances of the mines must raise them from "good" to "better," and "very good," according to the first position they take in the scale of goodness.

No doubt that "Inquirer" will want statistics in order to be satisfied. From the manner in which mining was formerly conducted here it is a difficult matter to get at such things, as they are re-

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corded only in the books of the estates, which, of course, are held too sacred for the profane eye to gaze into, therefore we must be satisfied with such evidences as I have adduced, which I think is quite conclusive. I am thoroughly convinced that the future prosperity of these mines will depend almost entirely on the effectiveness of the machinery. To attempt the old system of dressing with the present high price of labour is the height of folly. I am convinced also that with such machinery, let economy be exercised in putting it up, there is no better field of speculation open to the public.

Vale of Conway Lead Mines, Llanrwst. JAMES ROBERTS.

TYN-Y-FRON MINE.

SIR.—The men during the last few days have been engaged in clearing and securing the adit level, east of cross cut, nearly all of which has passed through ground that has been very productive for blende and lead ores. We expect to get into the forebreast so that I may be able to dial the adit throughout by about the 15th inst., and when this is done I shall be able to put the men to press on eastward in whole ground, and where every fathom that we drive will add materially to our present height gained, which is now nearly 40 fms., and will be over 100 fathoms before we reach the boundary, every foot of which for nearly 300 fms. long is entirely untried from adit to surface.

ABSAKOM FRANCIS.

Goginan, Sept. 11.

NORTH DEVON MINING.

SIR.—I was glad to see a notice of the Parracombe Mine in last week's Journal. Travelling through North Devon a few weeks since I chanced to stop at Parracombe a little time to rest myself a bit, ere attempting the 5 miles of hilly road that separates this village from Lynton. I was informed that a mine was shortly to be started, and that were it not for some little difficulty with regard to obtaining the necessary grant from one of the landowners mining operations would have commenced in earnest. I heard a few days afterwards that this difficulty had been removed, and an extensive sett secured upon very reasonable terms. Parracombe is only about 4 miles from the rich silver-lead district of Combe Martin, but nothing whatever, so far as I could learn, has been done in mining there until recently. Everyone whom I heard speaking of it seemed highly pleased at the idea of a mine springing up around them. I learned at the time that one of the lodes was discovered when digging for the foundation of a brewery. Some capital specimens of ore taken from the lode were shown me, and I am glad to see that the samples which were assayed proved so rich (15% in 20 for lead, and 12½ ozs. silver to the ton), the depth from which the ore was taken being but 10 ft. from surface. I take this opportunity of wishing the adventurers every success in their undertaking, and I shall be much mistaken, from what I heard and saw myself, if the mine at Parracombe does not turn out a prize.

TOURIST.

Birmingham, Sept. 12.

Meetings of Public Companies.

EAST POOL MINING COMPANY.

A meeting of adventurers was held at the mine, on Saturday (Mr. R. R. BROAD in the chair), the accounts for 12 weeks working, showing a profit of 286L 16s. 2d., which, with the balance from last account, amounting to 91L 7s. 6d., together 378L 3s. 8d., were passed to the credit of profit and loss against the balance of labour cost paid, amounting to 320L 18s. 9d., leaving a balance against the adventurers of 281L 7s. 15s. 1d. The following report was read:—

Sept. 3.—Great Lode. The engine-shaft sinking below the 180 is down 9½ fms. The 180 is driven east from sump winze 13 fms.; we have to drive about 2 fathoms more at this level to communicate with the winze sinking below the 180; this end is worth for the 180 per fathom. The 180 is driven east of engine-shaft 50 fathoms, and is worth for tin 14½ per fathom; at this point we are now driving south through the lode to see its entire width, having already passed through 7 fms. of lode worth on an average 12½ per cubic fathom. The winze sinking below the 180 is down 9½ fms., and will be communicated with the 190 in about six weeks from this time; this is worth for the 180 per fathom. We have three stopes working in the back of the 180, east of engine-shaft, worth for tin on an average 17½ per fathom each stope. The 180 cross-cut west is driven south 39 fms.; at this point we have reached the south lode, but for want of ventilation are unable to go further south until we have a communication with the 170. At the 170, east of engine-shaft, the cross-cut is driven south 12 fms., and has reached the engine lode, and we shall at once commence to rise in the back of this level to communicate with the stope above at the 180. The stope in the bottom of the 180, on the eastern ground, is worth for tin 12½ per fathom; we shall at once commence to sink in the bottom of this stope to communicate with the above mentioned rise.—Engine Lode: The 170 is driven west of engine-shaft 37 fms., and is producing a little tin—nothing to value; we hope in about a month to cut the cross-course, so as to communicate with the 180 cross-cut, and thus prove the south lode. The winze in the bottom of the 180 cross-cut, south of the engine lode, is down 7½ fms., and has intersected the flat lode mentioned below; we are unable as yet to give its value.—Flat Lode: At the 150 on this lode we have two stopes working, which are worth for tin 12½ per cubic fathom each stope.—South Lode: The 180 is driven east of the cross-cut 40 fms., and is worth for tin 14½ per fathom. The 150 is driven west from the eastern cross-course 32 fms., and is worth for tin 15½ per fathom. The 150 is driven east from long winze 41 fms., and is worth for tin and copper 15½ per fathom. There are two stopes working in the bottom of this level, worth for tin and copper 15½ per fathom each stope. There are two stopes working in the bottom of the 180, worth on an average for tin and copper 10½ per fathom each stope. There is a winze sinking in the bottom of this level, which is down 3 fms., and is worth for tin and copper 10½ per fathom. There are ten tribute pitches in this mine, the tribute differing from 10s. to 13s. 4d. in 1L.—JOHN MAYNARD (manager), CHARLES BISHOP, WILLIAM TIPPETT (agents).

The committee beg to inform their co-shareholders that the postponement of the meeting from the 3rd inst. to this day has enabled them to conform to the wishes of the Liverpool shareholders—to charge up all the paid labour cost of the mine, and which you will find particularised in the statement of accounts. The committee have also, in conjunction with the agents, made a material change in the operations of the mine, rendered necessary by the depressed value of tin and copper, the result of which they have no doubt will be favourable.

The CHAIRMAN reported that on Thursday last a special meeting was held on the mine, which was a most important one, and one fraught with a favourable circumstance as far as the adventurers were concerned. The object of that meeting was for settling the twelve weeks statement of accounts, and of taking into serious consideration the best means of effecting those economical measures which had been determined on for the closer and more profitable working of the mine. The large shareholders in Liverpool had been communicated with, and had agreed with the committee and managers in the desirability of adopting a new system, whereby the cost of the mine might be reduced to the lowest possible limits, the deficit at present existing cleared off, and the mine placed in such a condition that they might soon again be enabled to pay a dividend. (Hear, hear.) As the statement of accounts showed, the balance on the 12 weeks working amounted to 286L 16s. 2d., which, added to 91L 7s. 6d., the balance from the last account, made 378L 3s. 8d. Deducting this from the sum of 319L 18s. 9d. not charged in, the total deficit was 281L 7s. 15s. 1d. The consideration which had weighed with the committee, backed up by the managers, was how to work the mine in the most economical way; and, with the essential aid of their excellent purser (Mr. Martin) every article in the shape of labour or material had been analysed, even to the stationery in the office. The conclusion that had been arrived at was that a very considerable saving might be effected at each account, which would not only enable the present deficit to be speedily paid off, but also enable them to re-commence paying dividends. If the saving came up to their expectations (and the agents would strive that it should do so), they would be hoped, even pay a better dividend—of 2s per share. (Applause.) They stood in the position of possessing one of the best mines in the country; indeed, a very capable agent said to him a few days since that if they lived for 100 years they would not see its resources thoroughly exhausted. It was certainly unfortunate, whilst they were carrying on so heavy a concern, that they should only receive 286L 16s. 2d. profit on the 12 weeks working, whilst the lord of the soil, for the same period, carried off no less than 418L 10s. (Hear, hear.) In answer to Mr. Harris he (the Chairman) stated that they paid the lord 1½d. per ton for all minerals excepting tin, and for this they paid 1½d.

Mr. HARRIS remarked that inasmuch as some of the adventurers were dependent for their living upon the mine he would suggest the desirability of at once asking for a reduction of the dues during the existence of the present depression. (Applause)—Mr. W. H. RULE seconded this, and it was carried unanimously, the CHAIRMAN remarking that Mr. Bassett, the lord, had hitherto dealt very liberally with them, and that he had no doubt but he would do so on the present occasion.

On the motion of the CHAIRMAN, seconded by Mr. HARRIS, the statement of accounts and reports were adopted.

Mr. W. H. RULE remarked that as they were about to apply to the lord for a reduction of the dues he thought the smelters ought to try and get them a little better price for the tin ore produced. (Hear, hear.) He had lately seen a parcel of tin that had been sold for 37s. per ton at 60s. standard, the produce of which was 13½, but the returning charges of the smelters, which amounted to 1½, reduced the produce to 12½ net, or equal to giving 5s. per ton above the standard of the day. That parcel of tin would realise 37s./ton, but supposing they smelted their own tin, and it made a produce of 13½, the parcel would produce in metal 6 tons 15 cwt., which at, for the sake of argument (say) 70s. per ton, would realise 47s. 10s. The smelters allowed 3 lbs. in every cwt. of ore for waste, so that on a parcel of 10 tons the amount allowed for waste would be 5 cwt. 1qr. 12 lbs.,

yielding at 13½ produce 3 cwt. 2 qrs., which at 70 lbs. per ton would realise 12L 5s., so that the amount actually obtained was 48L 15s. For the sake of argument he would allow 5 per cent for brokerage, discount, and railway carriage, so that the amount stated would be reduced by 24L 5s., showing a margin on a 10-ton parcel of profit of 9½ 10s., out of which had simply to be paid the cost of smelting. Considering the present depression, and the fact that the smelters only paid them a 60s. standard, and that they were making something like 70s. per ton, less 5 per cent, discount and railway charges, he could not help saying that the margin between what they were giving the miner, and the price they were making themselves, was too wide. (Applause.) They were making a profit out of a 10-ton parcel of 90L 10s., from which they had simply to deduct the cost of smelting. Under these circumstances he thought it was high time the smelters should consider the position in which the Cornish miners were placed, and should give them something like the standard which they ought to. (Applause.) He suggested that a committee should be appointed in reference to the matter.

During some discussion which ensued Mr. MARTIN, the purser, pointed out that they must not make their calculations upon a false basis. He would remind them that the smelters, in addition to paying the carriage of the tin, allowing a discount of 2½ per cent., and paying the broker a commission on the sale, had also to run the risk of bad debts, so that 5 or 6 per cent. at the least had to be deducted from the smelters' profits.—Mr. HARRIS contended that the smelters had combined together against giving a better price for tin, and said the only way in which adventurers would benefit was by smelting their own tin.—Mr. W. H. RULE said he did not see that there would be the slightest difficulty in doing so, at a comparatively slight cost, too, for he believed that a smelting works could be erected on the mine for 250L.

Capt. ABRAHAM JAMES believed that the respectable smelting houses had done as much to keep up the price of tin as under the circumstances could possibly be expected of them. While, however, the larger houses had been doing their utmost to benefit the suffering mines of that county the smaller ones had been doing all they could to undersell them. This should be borne in mind, and in cases where such a thing was known the adventurers of mines should protect themselves by refusing to sell any tin to such parties. With the present price of tin it was impossible for the mines in that county to flourish, and he suggested, in order to improve their position, that the mine adventurers generally should combine and agree not to sell a single ton of tin for less than 50s. He believed that a combination would be that they would get this amount for an article which they now sold for 37L per ton.

Mr. W. H. RULE remarked that at the present time some of the smelters were buying Australian tin and selling it for English. He admitted that some of the respectable houses had done their best for the mines of that county, and said he endorsed every word that had fallen from Capt. James. After some further discussion the matter dropped.

The manager (Capt. Maynard) and the agent (Capt. Bishop) having been accorded a hearty vote of thanks for their valuable services in behalf of the mine, the former, in response, referring to what Capt. James had said, remarked that he found from experience that they frequently get a better price for tin from the small smelters than they did from the large ones.

The CHAIRMAN here took occasion to remark that in future, as far as was possible, every penny of the accounts would be closed up to the day of meeting.

A vote of thanks to the Chairman followed, and Mr. BROAD, in response, expressed a hope that the new era commenced that day would be a better augury for the success of East Pool. (Applause.)—Western Daily Mercury.

WEST WHEAL SETON MINING COMPANY.

The four-monthly meeting of shareholders was held at the account-house, on Sept. 7.—Mr. PRYOR, the purser, in the chair.

The usual preliminaries having been disposed of, the accounts were presented, showing a profit on the four months working of 49L 0s. 31d., increasing the credit balance to 443L 8s. 7d.

The CHAIRMAN congratulated the meeting upon the position of the accounts, which, he said, must be regarded as satisfactory when they took into consideration the low price of minerals with which they had to contend during the last four months. The price of copper alone, as compared with that obtained in the preceding four months, had made a difference to their credits of something like 800L, while on the sales of tin there was a reduction of about 200L, making a difference of 800L in their credits in the short space of four months. Their debts included 119L 12s. 6d. for bank charges, and 120L 11s. 6d. for rates; both these were exceptional charges, and did not come into every account, the rates being only charged once a year, and the bankers' charges twice a year. If they had had anything like the same price for their minerals as they had at the last meeting they would now have shown a credit balance of 1200L to 1300L instead of only a third of the amount. The bank book was on the table, and had very great pleasure in presenting it, because it would show that they had something like 1800L at the bank instead of an over-draft, as some mines unfortunately had.

Capt. JOSIAH THOMAS reported upon the various points of operations. The lode, which is principally standing to the south of the level, is improving in appearance, and produces some good copper and tin; it is now worth 8s. per fathom, and is likely to increase in value on being driven further west. The best chances of future success are in the new ground in the western part of the mine. He was sorry to have to report that the prices of both tin and copper are lower than at any former period in the history of the mine. The drop in these metals since the last account has taken off upwards of 700L from their credits that day. He regretted there had been such a reduction in the price of minerals. He had been looking over the prices of tin and copper when he came to the mine nearly 2½ years ago, and he found that if those prices had been maintained up to the present time they would now have had a profit of about 250L. Tin during that time had decreased 15s. a ton and copper 30s. a ton.

Mr. W. H. RULE suggested that as the wages of the girls had been reduced to 5d. per day, and that of the engineers from 2s. to 2s. 6s. per month, there ought also to be a reduction in the agents' salaries.

The CHAIRMAN said he was quite sure that every official in the company had the interest of the mine as much at heart as Mr. Rule or any other shareholder. They had talked the matter over that morning, and they were unanimous in voluntarily offering to reduce their salaries a guinea a month all round. They did this without any hesitation, and in the hope that when better times came round the adventurers would see fit to reinstate them in their former positions. At any rate they had now reduced their salaries with much pleasure, and had thus shown their desire to meet the shareholders in every way.

Mr. HARVEY thought the shareholders were greatly indebted to the purser and agents for having made such an offer. He did not think their salaries were at all too high.—Mr. RULE remarked that in these depressed times they must do everything in their power to reduce their working expenses, and the first thing they ought to look to is their agency charges. Their purser was receiving at the present time seven guineas a month, the engineer three guineas, the clerk seven guineas, the manager five guineas, the day agent ten guineas, and the two night and day agents nine guineas each. He believed they ought to manage this mine with only two agents, and that the salaries of the others should be reduced. The engineer should be reduced to two guineas per month, the purser to four guineas, and the two underground agents to 2s. 6s. a month each. If these were done the agency charges would be reduced to 32L a month, and a saving would be effected of 24L a year. If this was a rich mine he would not move at all in the matter, and should like to see agents well paid for their work; but as they have not a rich mine they ought to practice the utmost possible economy. At the same time he did not wish to act contrary to the wishes of the adventurers at large, and would be glad to hear what they had to say on the subject.

Mr. CLYMA said he thought it would be very unfair indeed to dismiss an agent at a moment's notice, and thought it better that the matter should stand over for consideration at the next meeting.

This view was generally supported by the meeting, and ultimately, after a long discussion, Mr. RULE yielded to the prevailing opinion, and the subject was adjourned, it being arranged that a meeting should be held at the end of three instead of four months.

A resolution was then passed accepting the offered reduction in their salaries of the purser and agents, and thanking them for their liberality.

KILLIFRETH.—At the meeting on Sept. 7 (Mr. J. Tregoning in the chair) the accounts showed a debit balance of 319L 9s. 10d. A call of 2s. 6d. per share was made. The agents reported on the various points of operation, and in conclusion say that on the whole they were pleased to say that the prospects of the mine have very much improved since the last meeting, and with only a small advance in the standard for tin and copper they should be able to meet the cost, whilst a moderate price for minerals would enable them to make a fair return to the shareholders. The outlay for the new steam stamps may now be considered as complete, and a great reduction in the working costs follow.

WHEAL AGAR.—At the general meeting of shareholders held yesterday (Mr. John Weston in the chair), the accounts, showing a balance against the adventurers of 511L 19s. 1d., were passed, and allowed; to meet this balance a call of 10s. per share was made, and it was unanimously resolved that the balance due to the bankers should be paid out of the proceeds of the call in priority to any other creditors. It was also determined not to borrow any money of a banker in future on account of this company. The report states that the engine-shaft has been sunk 10 fms. below the 195 in a rich lode, which has yielded the stuff of an average produce of about 12½ lbs. of tin to the ton of stuff. There has been sunk and stopped 50 fms. of ground, which has produced over 2000 tons of stuff, or about 10 tons of tin, being over 2 tons of per fathom, which, at the low price prevailing since the last meeting, is about equal to 7s. per fathom. Taking the length of the shaft (14 ft. by 8 ft.), the lode in the shaft has yielded over 150L per fathom, and is still as rich as ever.

[For remainder of Meetings see to-day's Journal.]

STONE QUARRYING MACHINE.—Mr. JOHN B. MCRAE, Mount Holly, Arkansas, U.S., has patented an invention to work some large quarries of soft white stone, and which produce a very useful building material, by a machine which is designed to cut the stone in a quicker and more economical manner than with the present slow and tedious methods of quarrying them, and the invention consists of a car with a steam-engine or other motor driving a vertical and adjustable front saw, a horizontal and adjustable saw back of the same, and a third vertical rear saw, at right angles to the front saw, to divide the long pieces of stone cut from the bed into blocks of the required size. The rear saw is made vertically adjustable by a suitable lever and guide arrangement. A car of suitable size is propelled to the place of work on a track laid in the quarry. The car is provided with a

steam-engine or other motor, by which the cutting saws are revolved and the car moved forward while the machine is in operation. At the front part of the car is placed a vertical saw of suitable diameter that cuts down into the bed of stone.

THE KIT HILL TUNNEL.

The present severe depression of mining enterprise in West Cornwall must largely enhance the importance of the energetic enterprise that are being made to develop the Kit Hill district in East Cornwall. We, therefore, learn with pleasure that the district in addition to daily increasing activity, and, we are glad to note, the number of hands employed being diminished, we hear that

tracts have recently been let for the erection of four new engines around Kit Hill, that new shafts are being sunk and old ones

that additional miners are being engaged at good wages, and it has been determined to commence an enterprise which may,

dertaking in the United Kingdom. From a scientific as well as a commercial point of view, this enterprise cannot fail to attract public attention, and, therefore, we doubt not the details will be of interest to our readers.

A glance at the map of Cornwall prepared by the officers of the Geological Survey shows that the metallic lodes are divided into

distinct groups, beginning at the Land's End and occurring at intervals along the axis of elevated ground extending from the Land's End to the extreme west to Kit Hill in the extreme east. It is, however, observable that each of these groups of lodes coincides with an outcrop of granite, which has pierced through its envelope

backbone, and these lodes-seamed vertebrae thus constitute the composite mining districts. An additional fact that cannot fail to impress even a cursory observer of the map is that the small lodes of the main axis of elevated land,

Accordingly it would not be incorrect to describe each mining tract of Cornwall as consisting essentially of a granite mass enveloped in killas, and rifted by a series of parallel cracks running through both rocks, these cracks being filled with a mixture of stony matter and metallic ores. Viewing also the considerable height of these hills above the surrounding valleys it would follow that the rational method of mining is to drive an adit or tunnel through the base of each hill in a direction at right angles with the east and west lodes. The several districts would thus be effectively drained to a great depth from surface, and every existing east-west lode in each district would infallibly be discovered. It is, however, observable that each of these groups of lodes run in a direction

along the axis of elevated ground, and that the lodes having a north-south direction, and others (counter) a somewhat diagonal bearing, but it is obvious that the greater majority of all the gold lines lie parallel to and upon the north-south slopes of the main axis of elevated land.

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are under one management, and belong in a great measure to the proprietors, so that no difficulty has been experienced in arriving at an understanding.

Here, then, it is proposed to pierce a tunnel through Kit Hill from north to south. The distance will be about two miles, and from the North Holmbush lead on the north, there are no less than 27 known east and west veins to be intersected, in addition to others that will, probably, be discovered in driving, together with cross lodes and counters. Some of these lodes will be cut at a depth of over 100 fms. (Kit Hill is 1,000 ft. in height), and all will be intersected at or comparable points near the junction of the granite and the killas, position generally acknowledged to be highly favourable for the occurrence of such deposits of metallic ore. The work will be carried on at such ends simultaneously, and at both rock-boring machinery will be employed, by which means it is thought that the tunnel may be completed in two years. A separate company—Kit Hill Tunnel Company—has been formed to undertake the matter, and it is arranged that a yearly rental of 5 per cent. on the Tunnel Company's up capital shall be contributed by the various sets through which the tunnel passes; and that, in addition, the company shall receive a royalty of one-tenth of all the profits derived from the various lodes cut. It may be, therefore, that the Tunnel Company will receive a large revenue from each one of 30 or more lodes without any corresponding outgoings, for when once the tunnel is constructed the cost of maintenance will be but a bagatelle. A minimum income of 5 per cent., with a strong probability of, indeed, the practical certainty—of receiving very large dividends, is the expectation that may be fairly entertained by those who constitute the company; and as the first to practically demonstrate the advantages of a system of mining which, in these days of the Mont Cenis and St. Gothard Tunnels, must ultimately be adopted in every considerable mineral district, we heartily wish Godspeed.

SOFT STEEL AND INGOT IRON.

The process for the manufacture of so-called soft steel or ingot iron, as a low a percentage of carbon as 10, or possibly lower, may contain an amount of carbon ranging from 18 to 10—say, a soft steel can be made at any notice containing any small amount of carbon within the range mentioned, has been patented by Messrs. HARVEY, of North Woolwich, who propose to make soft steel especially suitable for wire ropes, telegraph wires (where very low electrical resistance is required), cable wire, and various kinds which have to stand great elongation, twist, shaking strains, or other tests. Also for engines and other forgings, plates, sheets, hoops, and every purpose where metal required superior to charcoal iron, and where greater tensile and ductility, and toughness are required than can be obtained by heat wrought-iron worked in the ordinary way. The furnace preferred for this manufacture is the well-known so-called "regenerative" open hearth steel melting furnace, which by coal gas and atmospheric air; or other regenerative gas-generating flat-bottomed furnace may be substituted, capable of applying a heat sufficient to melt wrought-iron, and keep the wrought-iron in a fluid or molten state for some time. A tap provided at the back of the furnace through which the finished metal may first be run into a ladle of the same capacity as is usual, and from thence it is tapped into round, square, or other shaped moulds, as may be required to suit the purpose for which it is intended.

The improved process consists in charging on the bottom of the said furnace to have attained previously the highest temperature, or nearly so, which it can command) from 40 to 50, or (say) 60 per cent. (of total charge exclusive of ore) of pig-iron, the quantity of which pig-iron shall be hereinafter specified, to which is added 10 per cent. of ore, which ore will begin to oxidise the metal contained in the pig-iron as soon as the latter melts, and if the iron contains less manganese than 1.5 per cent., the manganese in the pig-iron must be made up by charging with the pig-iron 1 to 4 per cent. of spiegeleisen containing 20 per cent. of manganese; thus, if the pig-iron contains about 1.5 per cent. of manganese, spiegeleisen is charged, but if it contains (say) only 5 per cent. of manganese then about 2 per cent. (of total charge exclusive of the said spiegeleisen) should be charged. Different raw materials are used according to the tests which it is intended that the metal should be best able to bear.

The whole is melted a little more air is put on in order to decarburise the metal, and the full heat is kept up until the metal has all worked off the surface of the metal, or until the temperature is reduced by the action of the carbon contained in the iron. At this time the metal will be seen to sink below the level, and after some time it will boil uniformly over the surface. A sample of the boiling metal should now be taken and placed in water, dried, and hammered on a smith's anvil; if on the anvil without fracture, thereby indicating that the metal is from 60 to 75 per cent. of carbon. When this point is reached from 30 to 40 per cent. (of total charge, exclusive of ore) or 25 per cent. of wrought-iron or soft steel scrap is charged on the top of the furnace, in small quantities at a time (say) 5 to 10 at either end, which wrought-iron, in whatever shape, is to melt almost entirely by heat while still on the banks, and being pushed into the bath of metal. That portion, however, of the wrought-iron or soft steel scrap which is charged much earlier in the melting process, and which is not yet melted, may be turned in with advantage when at a good heat, and the melting in of the wrought-iron or steel scrap the flame being kept bordering on a non-oxidising quality.

The learned Judge, after giving a history of the initiatory legal proceedings in the case, pays a high compliment to the great ability of the respective counsel; compares the evidence given by practical miners and the evidence of scientists as to the geological formation of the claims; alludes to the class models of the claims, workings, and surroundings, and adds—Seldom, if ever, have we seen a case so fully explained. A full description of the respective claims and the geological formations are given. The opinion then goes on to discuss the character of the zone, as to whether it is a continuous lode; considers the meaning of the several mining Acts of Congress, the definition of the term "lode," as understood by miners, and as defined by law and science; argues that the definition of "lode" was first given by miners, and before it was defined by chemists or scientists, and that the mining Acts of Congress were framed for the benefit of miners; compares the Acts of 1866 and 1872, and says—"We are of opinion that the terms used in the Acts of Congress are applicable to all ores lying in ore bodies;" gives the character of the walls enclosing the mineral-bearing rock, and concludes that the limestone, quartzite, and shale must have been broken up, obliterating all traces of stratification, as the broken, crushed, and fissured condition appears on all sides. The broken, crushed, and fissured condition of the limestone differs from any other limestone in the country. Oxide of iron is found in the vicinity, leading the miner to infer the presence of gold and silver-bearing rock, and the limestone entitles it to the name of mineral-bearing rock.

The evidence in the case shows that limestone is a mineral bearing earth or rock. One witness testifies that the deposit between the quartzite and shale is, he considers, a single deposit. Another witness considers the entire mass of limestone impregnated with mineral ore, or, in other words, a great lode or vein as considered by miners, but science does not adopt this theory. There is no question of the sincerity or ability of scientists, however. The opinion elaborately reviews the scientific testimony of Clarence King and those witnesses who concurred with him in opinion, and comes to the conclusion that the Acts of Congress use the term vein or lode as miners understand it. The theory of separate or distinctive bodies of ore, therefore, falls to the ground. The Acts of 1866

ore disappears after two or three minutes this is an indication that a little more ore is required, which is accordingly thrown in at intervals till there is no action, as above explained. When this is the case no more ore is required, but a full heat is kept up for 15 or 20 minutes, so that the oxygen in the flame may possibly burn out little more of the carbon, and the metal will thereby be considerably heated.

When nearly the whole of the carbon has been eliminated the surface of the bath of metal will show numerous thin and very liquid pools, like water, and on which the heat seems to have greater effect than on the remaining surface. A sample now taken out will be found to contain about 12 per cent. of carbon. When this point is reached wrought-iron ranging from 10 to 30 per cent. or higher (of the total charge exclusive of ore) is introduced, according to the carbon required in the finished metal—that is to say, if soft steel containing 10 per cent. of carbon is required, then from 23 to 30 per cent. of wrought-iron must be added. If 17 per cent. of carbon is required, 17 per cent. of wrought-iron must be added, and so on, the quantity charged being in proportion to the carbon required. Such wrought-iron should be put in in quantities of 5 or 6 cwt., or more at a time on each bank, and allowed to melt in entirely by the heat of the furnace without pushing in any part thereof, except that which is furthest away from the metal, which should be turned into the bath at a white heat. In this way the metal will maintain its full liquidity and heat, and consequently it will not readily solidify when in the ladle or elsewhere after being tapped from the furnace.

In order to dilute or reduce the amount of the carbon contained in the metal soft wrought-iron must only be here used—that is to say, iron containing less than 12 per cent. of carbon, this latter being about the amount already in the metal; therefore, iron containing 11 or 10 per cent. of carbon or lower is used with advantage for this object, and if a soft steel be required with carbon as low as 10 per cent. it is found best to use iron with nearly all the carbon worked out, or containing (say) 0.5 per cent., or lower, as then a less quantity can be charged than if the iron contained more carbon. The carbon contained in the whole may thus be reduced to 0.6 or 0.7 before charging the ferro-manganese, which added to the small amount of carbon put in by the ferro-manganese will bring it to 10 per cent. in the finished metal. If the carbon contained in the metal before charging in the ferro-manganese should have been reduced to 12 or 15 per cent. by the first addition of wrought-iron, and the amount of carbon in the finished material be required to be not less than 17 or 18 per cent., then the amount or a little more of the ferro-manganese can be charged without putting in the second lot of wrought-iron. The quantity of ferro-manganese (say, 7 per cent.), as stated below, will be found amply sufficient, provided the quantity of manganese in the pig-iron charged at first be made up.

When the wrought-iron in this last operation has disappeared from the banks, or has become dissolved by the molten metal, a rabbler or bar should be frequently inserted and stirred about in order to assist in bringing the same into close contact with the other metal, thereby rendering it perfectly liquid and uniform with the other existing metal. This rabbling should be renewed at intervals during half-an hour after the wrought-iron has disappeared from the banks, in order to bring the metal into contact with the full heat of the furnace before tapping it into the ladle. A sample will now be found to contain from 6 or 7 to 11 per cent. of carbon, according to the quantity of wrought-iron charged at the last operation, and according to the proportion of carbon contained in such wrought-iron. A little burnt lime (say) 15 or 20 lbs., is now thrown in to assist in keeping fluid slag, and after 10 minutes 7 per cent. (of the total amount charged exclusive of ore) of powdered ferro-manganese containing not less than 70 per cent. of manganese is now charged into the centre of the molten bath, which ferro-manganese will melt in about two or three minutes, but in order to secure a perfect melting and union from five to ten minutes should be allowed previous to tapping, and the metal should also be well rabbled before running out.

THE RICHMOND CONSOLIDATED MINING COMPANY.

It has already been announced that the United States Circuit Court for the District of Nevada, sitting in San Francisco, has given judgment adverse to the Richmond Company, and much as the result may be regretted for the sake of the British shareholders concerned, there can, unfortunately, be little doubt that the decision is correct in law and in accordance with the principles of equity recognised both in this country and in America. The presiding judge—Mr. Justice Field—delivered the decision, which filled 64 manuscript pages, and occupied an hour in delivery.

The action was in the nature of an ejectment, and suit was brought in the United States Circuit Court by the Eureka Consolidated to perfect title, the Eureka claiming that the Richmond Company was trespassing on their ground. The Eureka Consolidated—the plaintiff in the case—held that their ore body was continuous, while the Richmond set up a theory that they were working on a pipe vein which they could follow indefinitely, even though it penetrated the patented lines of the plaintiff. The Eureka Consolidated claimed that the famous Pott's chamber, the great ore body from which the Richmond has taken a vast amount of bullion, was really the property of the Eureka, but the Richmond held that this was a portion of their pipe vein. The defendant claimed the right to follow the vein or ore cropping on their ground as far as they pleased, irrespective of the patent covering the adjoining ground.

The value of the ground contended for was between \$2,000,000 and \$3,000,000, and the trial was conducted by some of the best mining lawyers on the coast. The suit was originally brought in Nevada, but was transferred to San Francisco by agreement. The counsel for the plaintiff embraced Solomon Heidenfeld, Garber, and Thornton, R. S. Messick and H. K. Mitchell; and for the defence, Wren and Thornton, S. M. Wilson, Williams and Thornton, and Messrs. Hillhouse and Lunsing. The representatives of the two corporations were General George S. Dodge, President of the Eureka Consolidated; and Mr. Probert, managing director for the Richmond Consolidated Mining Company.

The learned Judge, after giving a history of the initiatory legal proceedings in the case, pays a high compliment to the great ability of the respective counsel; compares the evidence given by practical miners and the evidence of scientists as to the geological formation of the claims; alludes to the class models of the claims, workings, and surroundings, and adds—Seldom, if ever, have we seen a case so fully explained. A full description of the respective claims and the geological formations are given. The opinion then goes on to discuss the character of the zone, as to whether it is a continuous lode; considers the meaning of the several mining Acts of Congress, the definition of the term "lode," as understood by miners, and as defined by law and science; argues that the definition of "lode" was first given by miners, and before it was defined by chemists or scientists, and that the mining Acts of Congress were framed for the benefit of miners; compares the Acts of 1866 and 1872, and says—"We are of opinion that the terms used in the Acts of Congress are applicable to all ores lying in ore bodies;" gives the character of the walls enclosing the mineral-bearing rock, and concludes that the limestone, quartzite, and shale must have been broken up, obliterating all traces of stratification, as the broken, crushed, and fissured condition appears on all sides. The broken, crushed, and fissured condition of the limestone differs from any other limestone in the country. Oxide of iron is found in the vicinity, leading the miner to infer the presence of gold and silver-bearing rock, and the limestone entitles it to the name of mineral-bearing rock.

The evidence in the case shows that limestone is a mineral bearing earth or rock. One witness testifies that the deposit between the quartzite and shale is, he considers, a single deposit. Another witness considers the entire mass of limestone impregnated with mineral ore, or, in other words, a great lode or vein as considered by miners, but science does not adopt this theory. There is no question of the sincerity or ability of scientists, however. The opinion elaborately reviews the scientific testimony of Clarence King and those witnesses who concurred with him in opinion, and comes to the conclusion that the Acts of Congress use the term vein or lode as miners understand it. The theory of separate or distinctive bodies of ore, therefore, falls to the ground. The Acts of 1866

and 1872 dealt with practical miners. The conclusion reached is that the limestone in Ruby Hill constitutes one lode of rock-bearing metal. The rival interests and respective patents of the opposing companies was next considered.

The question of priority of location is deemed of no consequence in the case. No one but the Government has a right to object to the lines of location. The respective patents were fully set forth. The defendant claims that it can follow a vein from its croppings on its ground wherever it may lead. The Act of 1866 was again referred to, and the laws of the Eureka Mining District of 1865 explained. New district laws were made in 1869, under which the Richmond and Tip Top claims were located, but neither the Act of Congress of 1866 or the miners' rules speak of side lines. It was claimed, however, that the Act of 1866 allowed the locator to follow a vein into the adjoining land, but the miners meant that the location could follow a vein to the extent of the number of feet on the surface, else he might oust all his neighbours, and take the entire ledge. This construction of mining rules is given in every mining district.

The patent does not authorise a patentee to go outside of the surface lines. The line is on the side of claim, and not the line on the end. The line does not measure the extent of the miners' right as carving out a section of the lode beyond which he cannot pass. The diagram of a location must embrace more than linear measurement. The Act of 1872 allows a locator the dips, angles, and spurs of a vein cropping on his location, but not beyond the limits defined by the Act of 1866. The judgment concludes thus:—Our opinion, therefore, is that both the defendant and the plaintiff by virtue of their respective patents, whether issued upon locations under the Act of 1872, could only follow the veins or lodes lying within the lines drawn vertically downward at the end of the respective locations, and that each took the ores found in all veins or lodes the apex or top of which lay within those lines. The same conclusion would be reached if we looked only to the agreement of the parties made on June 16, 1873. Our finding is, therefore, for the plaintiff, and judgment must be entered thereon in its favour for the possession of the premises in controversy.

The judgment was signed by Mr. Justice Field, as presiding judge, and by Mr. Justice Sawyer, the circuit judge; and Mr. Justice Field stated that Judge Hillyer, of the Nevada circuit, concurred in the opinion. Mr. S. M. Wilson, counsel for the Richmond Mine, asked a stay of proceedings for 20 days. Mr. Justice Field objected to the request on the ground that the Court had already been over-worked in the case. Mr. Wilson desired special findings. Mr. Justice Field remarked that he had so much labour in the case that he wished counsel to prepare the findings.

It is said that the Eureka Company will immediately begin a suit against the Richmond for the value of ore extracted by the latter company from the disputed ground, which by this decision is adjudged to belong to the Eureka. It is estimated that ore to the amount of \$2,500,000 has been taken from this ground by the Richmond, for which that company must now account to the Eureka. One of the immediate effects of the decision will be the starting of two more furnaces by the Eureka Consolidated, and the employment of an increased number of men in the mine. As the town has been full of unemployed men waiting for the decision it has given many of them work, which they sadly needed.

FOREIGN MINING AND METALLURGY.

Recent adjudications of *materiel* in Belgium reflect the severe depression to which Belgian metallurgical industry has been reduced. Thus contracts have just been let for 2978 tons of iron sleepers, intended to lay 31½ miles of the Belgian State lines on the Hilt system. The Providence Forges Company offered to supply the whole quantity at 5½, 15s. per ton, old Vignoles rails to be taken in part payment at 3½, 14s. per ton. The Sclessin Company, the John Cockerill Company, the Acoz Forges Company, and the Couillet Company also tendered, but at slightly higher rates. Similar contracts were let in October, 1876, but the Providence Forges Company then required 6½, 12s. per ton, so that prices would appear to have fallen during the past year to the extent of nearly 13 per cent. Such a state of things as this must have seriously reduced the profits realised. Tenders delivered for the supply of the steel rails required for the 31½ miles of line about to be dealt with present still more surprising results. Thus the Ruhrort Steelworks Company tendered for the supply of 2865 tons of steel rails at 6½, 12s. per ton, delivered at Malines, or about 5½, 16s. 10d. per ton taken at the works. Such terms as these must be said to be almost, if not entirely, unprecedented. The Angleur Steelworks Company, the John Cockerill Company, and the Sclessin Company also tendered, but at higher rates; the Sclessin Company, for instance, required 6½, 16s. per ton. It should be observed, however, that the Ruhrort Steelworks Company requires payment in cash, and does not accept the proposed payment reserved to the Government of increasing the order given to 50 per cent. On the other hand, the Angleur Steelworks Company is prepared to accept all the clauses of the specification, in respect to the taking old materials in part payment, &c. Under these circumstances the contract will probably be awarded to the Angleur Steelworks. It is remarked that the German works, in making deliveries of steel rails to the German State railways, stipulate for 7½, 12s. to 8½, 12s. per ton, while when they tender abroad they reduce their rates to the extent of 15 or 20 per cent. To sum up generally the state of the Belgian iron trade, we may remark that prices have no tendency to improve, but that, on the contrary, they become lower from day to day. Contracts are to be let at Breslau on the 26th inst. for 25 passenger engines with tenders, 10 tank engines, 200 goods vans, 400 pairs of axles, steel tyres, &c. The Athus Blast-Furnaces Company has declared a dividend for the past year at the rate of 7 per cent. per annum on its share capital of 120,000. A sum of 4649l. was also carried to the reserve.

The annual imports of pig-iron from Great Britain into Germany, says the Cologne Gazette, consist for the most part of iron for casting, the use of German iron being restricted on account of the alleged difficulties in the material, while in the rolling and wrought-iron works German iron is chiefly used. Thus, in 1875, the German foundries consumed 6,220,253 cwts. of foreign iron, against 2,322,033 cwts. of native iron; while in the rail, building iron, sheet, and chain works 27,230,703 cwts. of native pig-iron and only 709,089 cwts. of foreign were used. Latterly great efforts have been made to replace foreign iron with native as far as possible in the foundries. Since the abolition of the duty on pig-iron in 1873 the Rhine-Westphalian works have exerted themselves more and more for the production of pig-iron suitable for casting purposes. At the request of the proprietors of a number of smelting works the Minister of Commerce has now arranged for a series of public comparative experiments with Rhine-Westphalian and Scotch pig-iron, to take place in the foundry of the Machine Constructing Joint-Stock Company at Essen. The experimenters hope that at the results will dissipate the prejudice against German iron.

With reference to the export of German coals, the Weserbote is informed that the brig *Diana*, now lying in a German port, has been chartered by the Hamburg American Steam Packet Company to carry Westphalian coals to St. Thomas. This will be the first cargo of German coals sent to the West Indies, and it is destined merely to supply the requirement of the Hamburg American Steam Packet Company's West Indian line. It is not unlikely, however, that it will be the forerunner of other consignments.

There have been few facts of interest to record in connection with the French iron trade. It may be observed that the Ardennes, which in the first half of 1876 produced 1700 tons of casting pig, effected no corresponding production in the corresponding period of 1875. The Escant, which produced 10,200 tons in the first half of 1875, also made default this year. This industry appears to concentrate itself in Champagne and Savoy; these are, at any rate, the only districts in which the production is making progress. The total production of casting pig in France in the first half of this year amounted to 131,000 tons, as compared with 168,000 tons in the corresponding period of 1876, showing a decrease of about 20 per cent. this year. Refining pig, on the contrary, regained a part of the ground which it had lost. As regards iron the difference is much less

AWARDED THE PRIZE MEDALS AT LEEDS, MANCHESTER, AND WREXHAM EXHIBITIONS, 1875 AND 1876.

HADFIELD'S STEEL FOUNDRY COMPANY,

ATTERCLIFFE, SHEFFIELD,

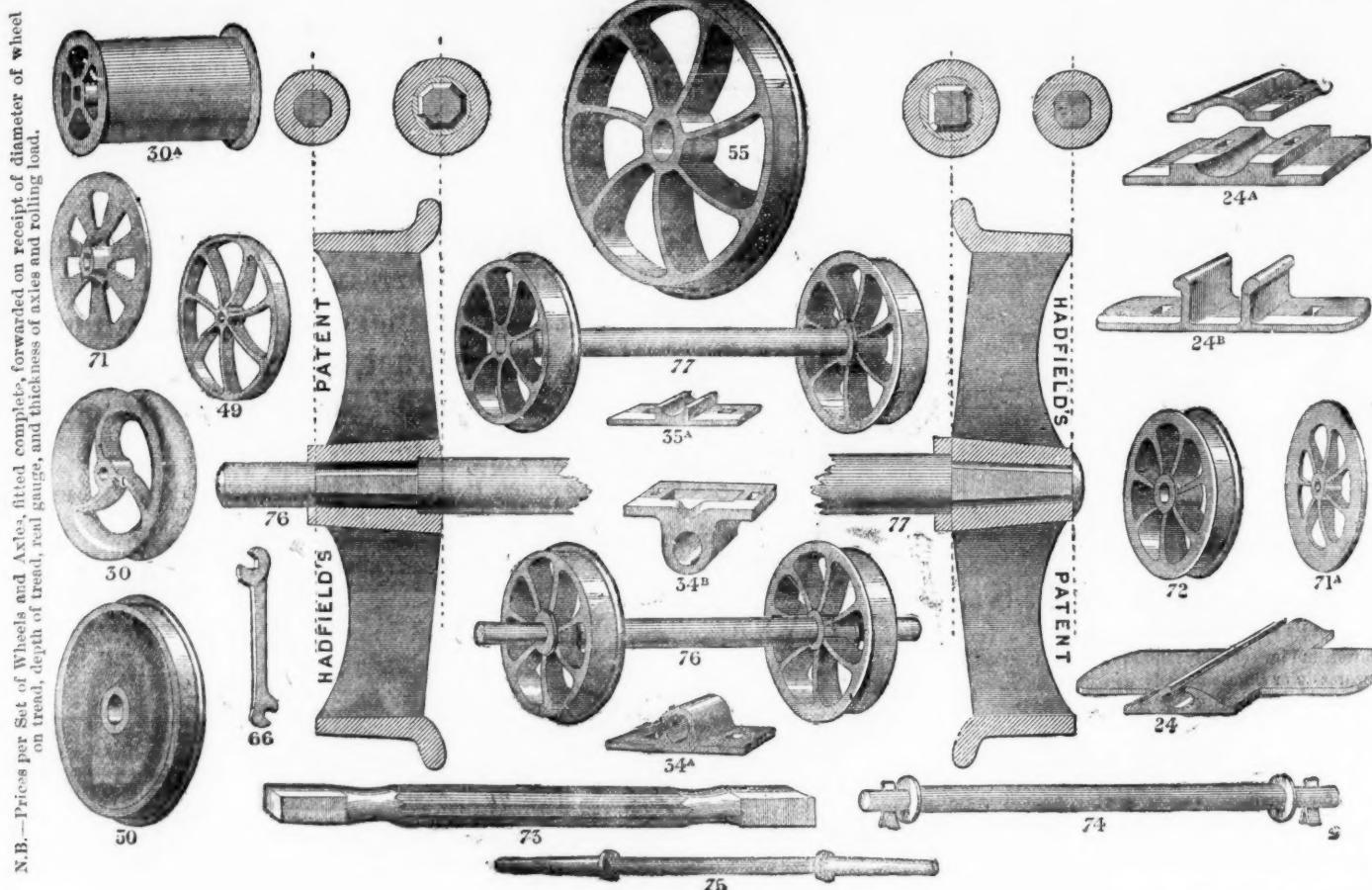
DEVOE THEIR EXCLUSIVE ATTENTION TO THE MANUFACTURE OF

CRUCIBLE STEEL CASTINGS, for Engineering and Machine Purposes,

AND ARE THE SOLE MAKERS OF

HADFIELD'S CRUCIBLE STEEL WHEELS.

One of our departments is specially adapted for the manufacture of these Wheels (as shown below), for Collieries, Ironstone Mines, Slate Quarries, Ironworks, Lead Mines, &c., &c. We have made, and are now making, many HUNDRED THOUSANDS; and having Patented a New Method of Fitting Wheels upon axles, being cheap, effective, and expeditious, we can execute orders entrusted to us with promptitude, our capacity in this department alone being equal to about 2000 wheels per week.

*This Sheet of Drawings is Copyright.***HADFIELD'S PATENT METHOD OF FITTING WHEELS UPON AXLES.**

The advantages of the above system are that the Wheels being forced upon a Taper Square-ended Axle, by Machinery, and then riveted (the machine securing truth), it is impossible that they can come loose or get within gauge. They are very cheaply fitted on, and run exceedingly true.

We construct the Arms of wheels upon the curved principle (as shown in the drawings above), consequently the shrinkage or cooling of the Castings is not interfered with, thus securing great advantage of our very strong material.

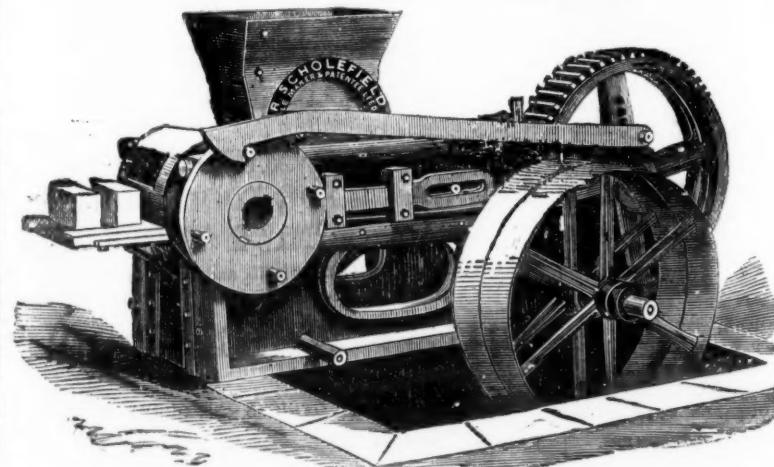
CRUCIBLE CAST-STEEL WHEELS, when cast by us, are made from one-third to one-half lighter than Cast-Iron. They cannot be broken while working, even with rough usage, and will

last at least twelve times as long as Cast-Iron, thus saving animal and steam power, and reducing wear and tear immensely.

We would also draw special attention to our INCLINE PULLEYS and CAGE GUIDES, the adoption of which will prove highly advantageous.

R. SCHOLEFIELD'S LATEST PATENT BRICK-MAKING MACHINE.

PATENTED 1873.



production, and the hands required to make 10,000 pressed bricks per day:—

2 men digging, each 4s. per day	... 8 0
1 man grinding, 4s. 6d. per day	... 0 4 5
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	... 0 2 0
1 boy greasing, 1s. 6d. per day	... 0 1 6
1 engine-man, 5s. per day	... 0 5 0
1 man wheeling bricks from machine to kiln, 4s. per day	... 0 4 0
Total cost of making 10,000 pressed bricks	£1 5 0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.
As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.

SCHOLEFIELD'S ENGINEERING & PATENT BRICK MACHINE WORKS
KIRKSTAL ROAD, LEEDS.

NOTICE TO COLLIERY OWNERS, AND OTHERS.

ALDER AND SEWELL,
Engineers, Ship & Engine Smiths,
 MANUFACTURERS OF
 PIT CAGES, KEPS, TUBS AND SCREENS; FLAT, BALANCE,
 COUPLING AND CRANE CHAINS AND TANKS,
RICHMOND STREET IRONWORKS,
 MONKWEARMOUTH, SUNDERLAND.
 PRICES ON APPLICATION.

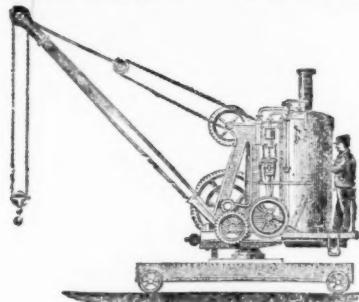
Increased Value of Water-Power.**MAC ADAM'S VARIABLE TURBINE.**

This wheel (which is now largely in use in England, Scotland, and Ireland) is the only one yet invented which gives proportionate power from both large and small quantities of water. It can be made for using a large winter supply, and yet work with equal efficiency through all variations of quantity down to a fifth, or even less if required. It is easily coupled to a steam-engine, and, in this way always assists it by whatever amount of power the water is capable of giving, and, therefore, saves so much fuel.

This Turbine is applicable to all heights of fall. It works immersed in the tail-water, so that no part of the fall is lost, and the motion of the wheel is not affected by floods or back-water.

References to places where it is at work will be given on application to—

MAC ADAM BROTHERS AND CO., BELFAST.

CHAPLINS' PATENT**STEAM CRANES,**
 15 Cwts. to 20 Tons,

Geared to hoist or lower, and turn entirely round in either direction by steam, separately or simultaneously, as required.

STEAM AND HAND DERRICK AND OVERHEAD TRAVELLING CRANES.**CONTRACTORS' LOCOMOTIVES.****STATIONARY ENGINES,**

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 62, QUEEN VICTORIA STREET, LONDON, E.C.

**MALLEABLE IRON CASTINGS,**

Every Description.

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 21 AND 22, LOVEDAY STREET,
 BIRMINGHAM.

BICKFORD'S PATENT
 FOR CONVEYING
 FIRE TO THE
 BLASTING ROCKS, &c.

Obtained the PRIZE MEDALS at the "ROYAL EXHIBITION" of 1851; at the "INTERNATIONAL EXHIBITION" of 1862 and 1874, in London; at the "IMPERIAL EXPOSITION," held in Paris, 1855; at the "INTERNA- TIONAL EXHIBITION," in Dublin, 1855; at the "UNIVERSAL EXPOSI- TION," in Paris, 1867; at the "GREAT INDUSTRIAL EXHIBITION," at Altona, in 1869; TWO MEDALS at the "UNIVERSAL EXHIBITION," Vienna, in 1873; and at the "EXPOSICION NACIONAL ARGENTINA," Cordova, South America, 1872.

BICKFORD, SMITH AND CO.,
 of TUCKINGMILL, CORNWALL; ADELPHI
 BANK CHAMBERS, SOUTH JOHN-STREET, LIVER-
 POOL; and 85, GRACECHURCH-STREET, LONDON,
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 PATENTEES OF SAFETY-FUSE, having been in-
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 fuse not of their manufacture, beg to call the attention of
 the trade and public to the following announcement.—

EVERY COIL of FUSE MANUFACTURED by them has TWO SEPARATE
 THREADS PASSING THROUGH THE COLUMN OF GUNPOWDER, and BICK-
 FORD, SMITH, AND CO. CLAIM SUCH TWO SEPARATE THREADS AS
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G. HUTCHINSON AND CO.,
 FORTH BANKS OIL WORKS,
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Beg to draw the attention of COLLIERY OWNERS and ENGINEERS to the Oil prepared by their special process. They never clog nor corrode, but keep the bearings cool and clean, and will be found the best and most ECONOMICAL LUBRICANTS at present in the market, being very DURABLE, UNIFORM IN QUALITY, and CHEAP. Prices from 2s.

SPECIALLY ADVANTAGEOUS RATES FOR LARGE CONSUMERS.
 References to many eminent firms who have used them constantly for years, amongst whom may be mentioned Sir W. Armstrong and Co.; Elswick Engine and Ordnance Works, Newcastle; R. Stephenson and Co., Engineers, Newcastle; R. and W. Hawthorn, Engineers, Newcastle; Hawkes, Crawshay, and Sons, Engineers, Gateshead-on-Tyne; Abbot and Co., Engineers, Gateshead-on-Tyne. Samples, prices, &c., on application. AGENTS WANTED.

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FROISETH'S NEW AND REVISED MAP FOR 1875.
 Size 40 by 56 inches, scale 8 miles to the inch. Handsomely engraved, co-
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DESIGNED FOR USING COMPRESSED AIR OR STEAM,

SIMPLE, COMPACT, PORTABLE.

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No. 1 size, 7 in. single cylinder, with 2 ft. drums.

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Larger sizes made with two cylinders.

A.—6 in. double cylinder, with 2 ft. 3 in. drums.

B.—8 in. " " 3 ft. 0 in. drums.

C.—10 in. " " 3 ft. 6 in. drums.

D.—12 in. " " 4 ft. 6 in. drums.

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ENGINEERS, MAKERS OF PUMPING AND WIND-

MACHINERY, AND FORGINGS OF EVERY

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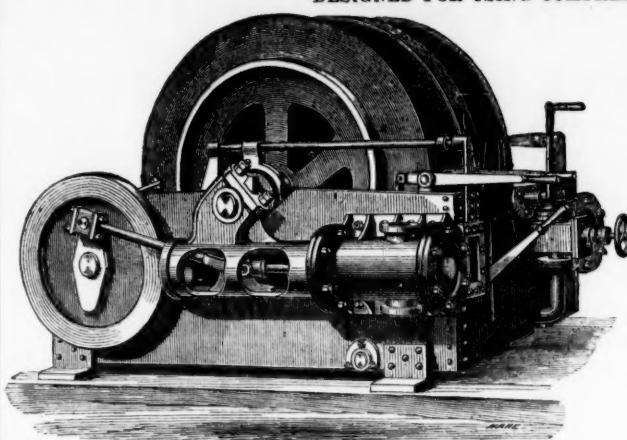
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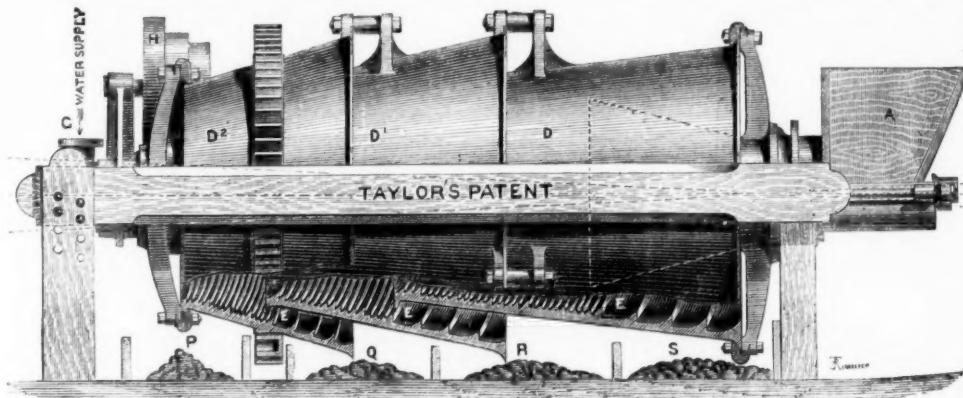
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FOR SEPARATING AND SIZING MINERAL AND OTHER SUBSTANCES.

By the aid of this invention any materials, which are of different specific gravity, can be concentrated and sorted mechanically while in the case of ores the fine mineral is brought up with the larger particles instead of being washed into the waste—a most important feature.

This machine uses very little water in proportion to the quantity of material treated, and will be found a most useful and efficient dressing apparatus.

For further particulars, and to see machines at work, apply to the Patentee,

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MANUFACTURERS OF

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CAST STEEL FOR TOOLS. CHISEL, SHEAR, BLISTER, & SPRING STEEL.

MINING TOOLS & FILES of superior quality.

EDGE TOOLS, HAMMERS, PICKS, and all kinds of TOOLS for RAILWAYS, ENGINEERS, CONTRACTORS, and PLATELAYERS. LOCOMOTIVE ENGINE, RAILWAY CARRIAGE and WAGON SPRINGS and BUFFERS.

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Manufacturers by STEAM POWER of all kinds of Wire Web, EXTRA TREBLE STRONG for

LEAD AND COPPER MINES.

Jigger Bottoms and Cylinder Covers woven ANY WIDTH, in Iron, Steel, Brass, or Copper.

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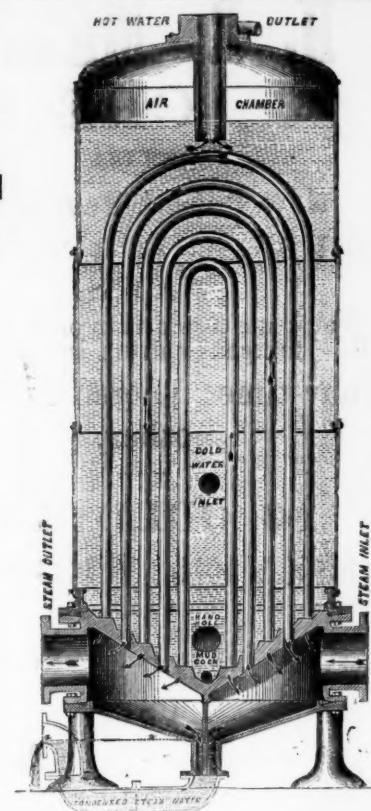
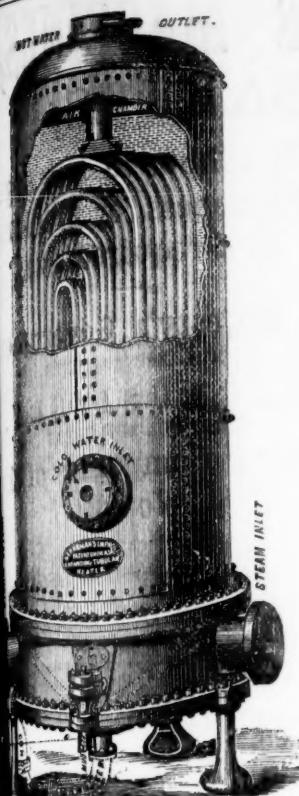
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Having purchased the Engineering Business lately carried on by R. BERRYMAN AND CO., at 23, Congreve-street, Birmingham, and 28, Wilson-street, Finsbury-square, London, have removed the
same to their Works at TIPTON, to which place ALL COMMUNICATIONS SHOULD IN FUTURE BE ADDRESSED, and where the BERRYMAN HEATER can be seen at work, and in every stage
of manufacture.

Being the SOLE MAKERS and PATENTEES of these CELEBRATED COAL SAVERS and EXHAUST STEAM UTILISERS, and having remodelled and greatly improved them, adding largely to
the HEATING SURFACE and WATER CAPACITY, J. W. and Co. have put down a special plant, which includes an entire new set of improved patterns, enabling them to offer these FEED WATER
HEATERS to the public at

GREATLY REDUCED PRICES.

The arrangement of BRASS TUBES of a great length giving an enormous HEATING SURFACE makes this HEATER not only the MOST POWERFUL ever invented, but its FIRST COST PER
UNIT OF HEATING SURFACE IS LESS THAN HALF THAT OF ANY OTHER. It will condense the whole of the Exhaust Steam from the Engine if required, and entirely does away with the NOISE
PRODUCED BY THE BACK PRESSURE FROM EXHAUST PIPES.

ALL THE TUBES ARE OF SPECIALLY PREPARED SOLID DRAWN BRASS AND COPPER; both ends are expanded into the bored holes of the same Tube Plate, METAL TO METAL, and every
tube is free to expand and contract independent of each other. Leakage is impossible, as, when the tubes are once fixed, nothing short of cutting out will remove them. No surf adheres to the
tubes because of the difference of expansion between SURF and BRASS. The inside of the Heater can be washed out by means of the mud cock and hand hole whilst at work.

Only one pump or injector is required, and as the Heater is placed between the pump and the boiler, the water is forced, COLD, into it, and passes out at the top hot into the boiler direct. Where
the water works pressure is sufficient no pump or injector is needed.

When the water being heated to BOILING POINT UNDER PRESSURE in the Heater, a saving of from 20 per cent. to 25 per cent. in fuel is effected; the disastrous results of grease in boilers are also avoided,
as the grease and other loose matter in the water being deposited in the Heater, the acids are liberated there instead of in the boiler.

They can be lined with BRASS, COPPER, or LEAD, as may be required in special cases for heating water or any kind of liquor in large quantities for CHEMICAL WORKS, BATHS, WASH-
HOUSES, AQUARIAS, GREENHOUSES, BREWERIES, WOOL WASHING, DYE WORKS, TANNERIES, &c., &c.; they will also HEAT AIR FOR CUPOLAS AND BLAST FURNACES, and are
suitable for INTERHEATERS for compound engines with direct steam from the boiler with a further saving of 15 per cent.

The New Price List, with detail information, is now ready, and will be sent on application, together with an Illustrated Catalogue, with references and testimonials from Firms using TWO HUN-
DRED AND THIRTY-THREE of these Heaters.

BOLTS, NUTS, AND COACH SCREWS.

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PROVIDENCE BOLT AND NUT WORKS, THE GREEN, DARLASTON,

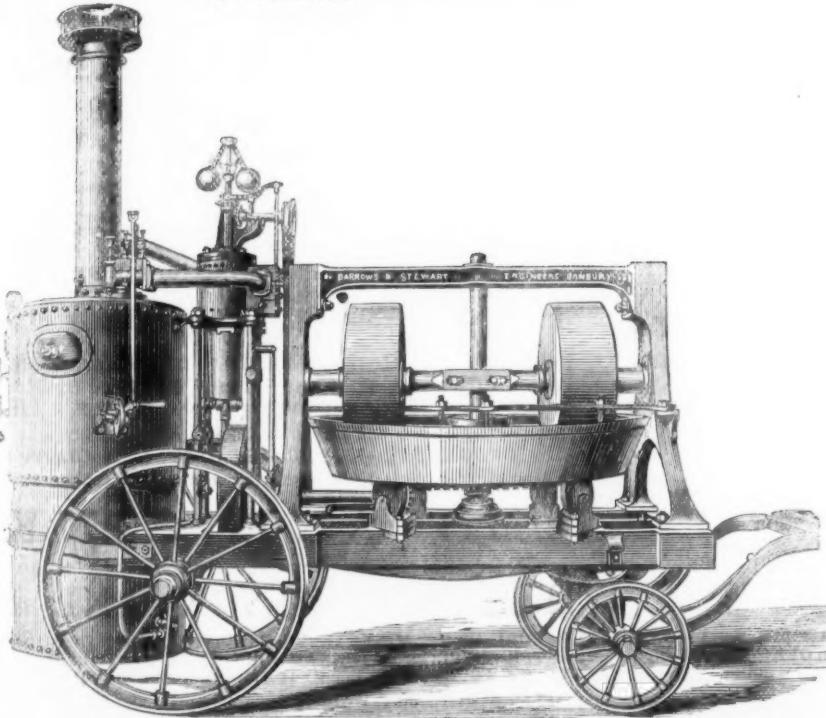
Manufacturers of all kinds of Shipbuilders', Engineers', Coach, Wagon, and Fish Bolts; Coach Screws; Railway Spikes and Brobs; Hot-pressed and Forged Nuts, Washers, &c., &c.

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Boiler Tubes, Hydraulic Tubes,
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SCIENCE AND ART DEPARTMENT, ADMIRALTY, &c.
MATHEMATICAL, DRAWING, and SURVEYING INSTRUMENTS of every
description, of the highest quality and finish, at the most moderate prices.
Price-list post free.
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ADDRESS—GREAT TURNSTILE, HOLBORN, LONDON, W.C.

H. R. MARSDEN, PATENTEE AND ONLY MAKER BLAKE MACHINES, ORE CRUSHERS AND STONE BREAKERS,

WITH THE

New Patent Reversible
CRUSHING OR CUBING
JAWS,

WHICH ARE CONSTRUCTED OF A PECULIAR
MIXTURE OF METAL, WEARING

Four times longer than any
other.

**60 GOLD AND
SILVER MEDALS.**

OVER 2000 NOW IN
USE.

FIFTY per Cent., and upwards, saved by using these Machines.

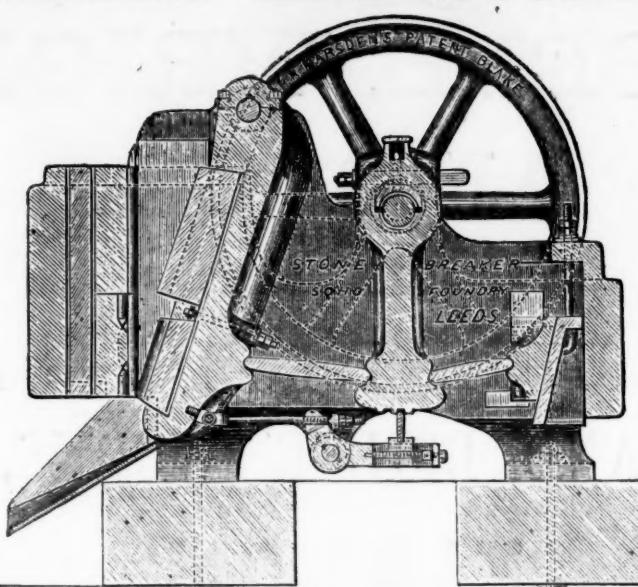
TESTIMONIAL FROM MESSRS. JOHN TAYLOR AND SONS.

DEAR SIR.—We have adopted your Stone Breakers at many of the mines under our management, and are pleased to be able to state that they have in all cases given the greatest satisfaction. We are, yours faithfully, JOHN TAYLOR AND SONS.

H. R. Marsden, Esq.

INTENDING BUYERS ARE CAUTIONED AGAINST PURCHASING OR USING ANY OF THE NUMEROUS PATENTS OF H. R. MARSDEN.

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DERBY SHOW, SEPT. 18 and 19.—H. R. MARSDEN, of Leeds, will exhibit in full operation one of the well-known BLAKE STONE BREAKERS and ORE CRUSHERS, fitted on wheels with apparatus, and also fitted with the NEW PATENT REVERSIBLE CUBING JAW, which last FOUR TIMES LONGER THAN ANY OTHER. Parties desiring to see their own material crushed or broken are requested to bring samples with them.



For Crushing to any degree of Fineness, or Breaking to a required size.

Her Majesty's Government
USE THESE MACHINES
EXCLUSIVELY
ALSO ALL THE GREAT
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